BULLETIN OF THE INSTITUTE
OF THE HISTORY OF MEDICINE

THE JOHNS HOPKINS UNIVERSITY

(SUPPLEMENT TO THE BULLETIN OF THE JOHNS HOPKINS HOSPITAL)

Editor—HENRY E. SIGERIST

VOLUME II MAY, 1934 NUMBER 3

GLAUCOMA

A HISTORICAL ESSAY

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"And the eyes of them that see shall not be dim. . . . "—ISAIAH 32:3

This visual affliction has probably been a source of unhappiness to man from the time he first existed on the earth as the species Homo sapiens. There is no prehistoric evidence of its existence and no actual record until late in historic times, but given our present knowledge of the eye, it is difficult to believe that such a condition could have been non-existent.

Like so many other things in the field of medicine, glaucoma was first recorded by Hippocrates, when in the course of his Aphorisms he named "glaucosis" (1) as one of the diseases of old age. This was an entirely descriptive term meaning a greenish, or bluish-gray color. Hippocrates states: "If the pupils assume a pathological appearance, and to be sure, if they are dark blue without occasion, and if this happens quickly and completely, then there is no hope for recovery. If the color is that of sea water, then the injury will develop steadily and very slowly and commonly will seize the second eye a long time after the first (2)." This is, in general, quite accurate, but Hippocrates made no attempt to distinguish it from cataract, a condition

which he also knew, so it is doubtful if he really meant anything else than cataract. However, the name has since been used to designate the condition which we now know as glaucoma.

About one hundred years later, Demosthenes (3) erroneously explained glaucoma as the result of dryness and hardness of the crystalline humor, "siccitas" and "concretio."

The Greek and Roman writers of the Christian era learned at least one important thing, namely, that a great difference existed between the morbid conditions recognized by them as being behind the pupil and those resulting in blindness. Celsus (3) (about 25 A.D.) divided them into two groups. Some of these conditions could be relieved by operation and were called "suffusions"; others were most unfavorable from an operative view and were called "glaucomata." This was essentially the doctrine accepted by Rufus, Galen, and Paulus Aegineta. Nothing of consequence was added until many centuries later.

Rufus of Ephesus, who lived about 50 A.D., was the first to make a distinction between glaucoma and hypochyma by saying that the former was "the condition where the humor-crystalloids have taken on a blue color after softening," while the latter was the trouble produced by "a thickening of the inflowing fluids between the crystal and the cornea" (3).

Galen describes glaucoma in much the same way as the earlier Greek doctors; he considers it as a characteristic affliction of the crystal with "trouble and discoloration," and diagnoses it as a mechanical abnormality to be placed in the same group in which the crystal seems dislocated to one side or other, or above, or below, the latter event always resulting in double vision. He also noted glaucoma to be by far the most common cause of blindness (4).

In the seventh century, Paulus Aegineta (625–690) briefly considers glaucoma. He refers to Rufus and makes the same distinction between this and suffusion, or hypochyma, stating that "glaucoma has been accounted an affection of the crystalline humor which is changed by a watery substance to a cerulean blue, but suffusion is reckoned a defluxion of humors concreted between the cornea and the crystalline lens. Glaucoma is in every case incurable. Suffusion may indeed be cured, but not always" (5). He goes on to give a long list of cures, or

treatments, for suffusion but offers nothing to help glaucoma; and so it continued to be regarded for many centuries as hopelessly incurable. Further on, in discussing cataracts, Paulus for the first time reported an observation of a symptom which distinguished cataract from glaucoma, summarizing it as follows (6): All those who have cataracts, therefore, see the light more or less, and by this we distinguish cataract from amaurosis and glaucoma." The validity of this statement would of course depend upon the stage at which each disease was examined, but it was a worth-while comment hitherto unannounced.

This concludes the observations of the Greek and Roman writers. We see that the knowledge of these notable authorities was very limited and hazy. About the most one can say is that these ancients did recognize the disease; they knew it was very serious and different from other conditions of the eye, but were unsuccessful in making a clear distinction, or even in definitely separating it from cataract.

Following this Greek-Roman period is that of the so-called "Dark Ages" during which nothing was contributed to the advancement of glaucoma and it was not to be mentioned again until eight hundred years later when a 15th Century physician, Benvenuto Grassi, in 1475, published his book "De Oculis eorumque egritudinibus et curis." This was the first printed book to be devoted entirely to the eye, but it offers nothing new concerning glaucoma and merely follows the ideas of the ancient writers.

Joannes Gorraeus (1505–1577) attempted to distinguish between glaucoma and cataract, but did little more than repeat what Paulus had said centuries before. He wrote: "Nevertheless it followeth not that they are alike, for the cataract is a collection and an heap of humors other than those which are naturally in the eye, flowing to it from some other place: but glaucoma is properly used when the crystalline humor is dry and thick, and the color of it is green, whereupon the eyes seem green or pale. Moreover, the cataracts are always so great that they overspread and cover the whole apple of the eye, and hinder the whole sight: but hypochyma possesseth all the crystalline humor, and it is dry in every part, and by reason of the dryness it groweth so thick. Besides, these cataracts may be cured, but glaucoma is incurable when it has once attained to perfection, as Aegineta

writeth concerning the opinion of Rufus" (7). This of course is an entirely wrong aetiology of both, but it is more of a distinction than any one previously put forward.

In the year 1585 Jacques Guillemeau (1550–1612) wrote a small book on eye diseases called "Traité des Maladies de l'œil" which is regarded by Garrison (8) as the best of the Renaissance books written on ophthalmology. One section of the book (section 6) is devoted to "those diseases which are incident to the humors of the eyes," and the first chapter of this section is on glaucoma. For the most part, our author quotes Paulus Aegineta and Gorraeus, but adds two bits of information which were not given by any of his predecessors. The first of these is a brief description of what he calls argyrics, or a white spot growing on the crystalline humor which is easily seen and more or less hinders the sight, according to its size, and may be accounted the beginner and messenger of glaucoma. The second contribution, if it may be called such, contained the first published treatments of glaucoma which he did not claim as cures, but merely suggested as a possible help. Some of his recommendations were anis-seeds, fennel, lin-seeds, hollyhock, mucilage of quince and lin-seeds, violets, aloes and many other plant extracts and concoctions. He also advised the use of those medicines which had the virtue of dissolving cataracts and webs, *e.g.*, hot bread from the oven in which has been baked the powder of anis-seeds and fennel; the loaf to be divided and placed upon the eye while as hot as the patient could stand and remaining there for some time (9).

The first book on the eye to be written in English was that of Walter Bailey (1529–1592) "A Briefe Treatise Touching the Preservation of the Eie Sight," which was published in 1586, just one year after Guillemeau's work. This was a small book of 23 pages and does not even enumerate the known afflictions of the eye, and therefore does not mention glaucoma specifically, but tells how to care for the eyes in general; giving the benefits of good diet, listing a large number of foods having a good or bad effect on the eyes, the results of drinking, sleeping, reading, and the effect of various kinds of light, including that of the moon, upon the eyes (10). Plainly this book has no historical bearing on glaucoma itself, but is mentioned here for its position in the literature of ophthalmology.

We may mention here that Richard Banister, an English ophthalmologist, published a book in 1622 which he called "A Worthy Treatise of the Eyes" (7) which was for the most part an exact copy of the two books just reviewed. The first part of this book, consisting of 55 pages, is called a "Breviary of the Eyes" and is Banister's original work, but the second part is a translation of Guillemeau's work, while the third part is a copy of Bailey's book. Nowhere in the book does Banister name either of these men, whence many later writers erroneously gave him full credit for the entire production.

Glaucoma itself is not spoken of in Banister's own original work, but in writing about incurable cataracts he twice described a condition which was undoubtedly glaucoma and for the first time called attention to the increased tension: "For the other three imperfect and incurable Cataracts, as the humour predominateth, that is the cause of them, so is the colour; yet all have the nerves flopped, alteration of the colour of the cristalline humour, with a durosity or hardnesse of the whole eye and privation of sight." Further on, while discussing his treatments and cures, he gives this as one of the signs of an incurable affliction: "thirdly, if one feele the Eye by rubbing upon the Eielids that the Eye be grown more solid and hard, than naturally it should be." No more attention was given to this sign until over a hundred years later when Platner described the condition in connection with glaucoma itself.

The early part of the eighteenth century was an important period in developing the knowledge of glaucoma, offering the first real dissection and observation of the afflicted eye. It is most interesting to contrast the work of two noted Frenchmen, Maître Jan in 1707 and that of Brisseau in 1709. The former wrote a "Traité des Maladies de l'œil" (1707) in which he says that cataract is, in general, an opacity of the crystalline lens instead of infusion. This he determined by dissection, but not having the opportunity to dissect a glaucomatous eye, he still maintained that also to be a disease of the lens: "Une altération tout particulière du cristallin par laquelle il se dessèche, diminue en volume, change de couleur et perd sa transparence, en conservant sa figure naturelle, et devenant plus solide qu'il ne doit être naturellement" (11). He also calls glaucoma a false cataract, all of which shows that it was still completely misunderstood and

scarcely distinguished from cataract. In giving the symptoms he states that the signs in the beginning are like those of cataract, except that the pupil is no larger than ordinarily and keeps its roundness. The patient sees smoke or clouds and later notices a change in color. The movement of the uvea, he says, is preserved when light rays pass through the crystal until late in the disease. Maître Jan's prognosis was a bad one, but at that time quite true; he said that glaucoma was incurable and its progress could not be stopped. Maître Jan believed the alterations of the disease were caused by fault of the nourishing fluids.

In distinct contrast to this is the conception of Brisseau stated two years later (1709) in his book "Traité de la Cataract et du Glaucoma." In this work, Brisseau clearly distinguishes between cataract and glaucoma, saying for the first time that glaucoma is a disease of the vitreous humor and not of the lens, while cataract is an opacity of the lens. Speaking of glaucoma his words are, "Cette maladie n'attaque point du tout le cristalin, et consiste dans l'altération de l'humeur vitrée, qui peut diversement estre vitiée" (12). His conclusions were based upon two dissections, one of which he did himself upon a glaucomatous eye sent him by M. Barbaroux, the leading physician of Dunkerque, the other being performed and described by Mareschal who dissected the eyes of Bourdelet, the physician of Louis XIV. Bourdelet had a disease of the eyes termed cataract and asked that the eyes be dissected after his death. On doing so, Mareschal found that the vitreous humor was also somewhat opaque, consequently Brisseau recognized that any operative attempt would be unsuccessful and felt justified in terming this condition of opacity of the vitreous humor as glaucoma. With the knowledge of the dissection and knowing that glaucoma was not to be cured by the depression operation, the reasoning leading to his conclusions is quite obvious; if it were a crystalline defect, it could be combated by the same means as cataract.

Brisseau also said that the green color was the least of its qualities and must not necessarily be present when glaucoma is formed, and that cataracts could be colored; therefore, one must not stay too close to the name. He described true glaucoma as the condition in which the vitreous humor becomes thick and opaque and some color is

formed. The glistening cataracts, he said, are always produced from true glaucoma by the change in the vitreous humor, and not by a change in the crystal itself. Using a simile to explain this color of the crystal he described it "de même qu'une pierre du temple qu'on enchasseroit dans le chaton d'une bague où on auroit mis du vermillon ou du verd de gris en poudre paroîtroit rouge ou verte" (13).

As to the cause of glaucoma, Brisseau is rather vague and does not make a definite statement. He said it was difficult and might be either external or internal, suggesting that a very acid humor of certain character could change the vitreous body. He realized that very little was known about it and that more work needed to be done, expressing at the same time the hope of doing more himself.

This careful observation and clear reasoning on the part of Brisseau represents one of the major advances in the history of the disease. In separating it from the lens, and consequently from cataract, we may say he made the first real progress toward the solution of a long-lived mystery.

Immediately following this work, many physicians of the time agreed that glaucoma was not a disease of the lens, in particular Heister and St. Yves. Lorenz Heister (1683–1758) (14) was one of the leading German surgeons of this period and thoroughly agreed that Brisseau's case was a true glaucoma, which was an opacity of the vitreous tunic and not of the lens. He was further convinced of this by two unsuccessful operations which he cited; one on a blind man operated on by Vaillont, an eminent surgeon of Amsterdam, who could plainly see the needle behind the pupil, and an opacity still behind the needle showing the trouble to be deep-seated and explaining why the operation did not succeed. A similar operation was performed by Bertelius, and was also a failure (14).

St. Yves in his book "Les Maladies des Yeux" denies that the seat of glaucoma is in the crystalline lens; but neither does he assign it to the vitreous humor, for by close inspection he found a kind of change in the crystalline lens which came upon a palsy of the ciliary nerves, so he called glaucoma a combination of cataract plus gutta serena (15).

In spite of the work of Brisseau and its confirmation by Heister, ophthalmologists did not agree that glaucoma was other than an

opacity of the crystalline lens. Notable among these was the Irish ophthalmologist Sylvester O'Halloran whose book "A New Treatise on the Glaucoma and Cataract" was published in 1750. He thoroughly reviews the work of Maître Jan, Brisseau and Heister, and then says that glaucoma is merely a different name for cataract, and therefore is an opacity of the lens. Speaking of the operation performed by Vaillant and referred to by Heister he says (16): "Now it is evident that there must have been an opacity of the crystalin lens in the above cases, or for what purpose would they have passed the needle? And if so how could the opacity of the vitreous show itself through this body, when it refused admittance to rays of light from external objects?" Such is an example of his arguments, which almost show obstinacy, in trying to stand by the old idea that glaucoma was a change in the lens; and in saying it was the same as cataract he placed his knowledge of the subject on a level with that of the earliest Greeks.

Although Banister, in 1622, recognized a condition of the eye in which there was firmness and hardness, Johann Platner (1694–1747), German ophthalmologist, was the first to describe specifically the firmness of the eye to touch in glaucoma, stating that it could be detected by the fingers. His Latin account of this phenomenon (1745) runs as follows: "next to this defect is the crystalline lens, and thus swollen with its covering when the other parts of the eye push on it. It is recognized by these signs: hardness of the eye, resistance to the fingers, raised and large, and more than naturally prominent. In this weight pain is felt. When one looks into the eye it has the color of sea water. Finally, so much invades, the pupil dilates, and acquires mydriasis. Doubtless since both vitreous humor and retina press on the lens, as it swells more, all faculty of seeing perishes and amaurosis appears" (17). Again not much was made of this increased pressure at the time, but it was taken up by later men and in modern times came to be emphasized as one of the most important signs of the disease.

Weller, another German, writing in 1826, gives a very good description of the course of glaucoma. "The patient first sees smoke in front of the eye, which appears suddenly after the loss of one eye. The trouble can disappear for hours, or even whole days, when the

patient is distracted by gay emotions and is in good health. He later sees black objects floating which disappear as the sight is lost, and if one examines the eye weakness of the pupil is found. Gradually light, dull pains are present having the sensation of a light pulling upward of the eyebrows; later this becomes violent since the disease is first accompanied by congestion or inflammation. Still later a candle-light produces a rainbow. After this, pain is felt as if the eyeball were splitting; it becomes immovable, loses its black color and is curded" (18). Weller also believed that the disease affects the retinal nerves, which he said could cause the transparency of the vitreous body and other changes.

The next important work on glaucoma (19) was that of William MacKenzie, an Englishman, whose large volume "A Practical Treatise on the Diseases of the Eye" was first published in 1830. This was the first outstanding English work on the subject and by far the best to appear in the first half of the nineteenth century. MacKenzie was the first to handle glaucoma in a systematic manner, considering its various aspects in order, as general appearance, pathology, symptoms, and so on. He also made the first extensive study of dissected eyes afflicted with this particular disease. He does not state the exact number, but says he made "several" careful examinations of such eyes.

As to the general appearance of the affected eye, he believed that close inspection would lead the observer to conclude the trouble was more deeply seated than in the lens and that one first looks through the transparent aqueous humor and lens, although this is more obvious in the commencement of the disease than in the later stages. It seems to appear, he says, in the center and bottom of the vitreous humor first, and later the opacity, always of a greenish color, appears immediately behind the lens.

As to pathological data determined by dissection, he made four conclusions:

1. The choroid coat, and especially the part in contact with the retina, is of a light brown color without any appearance of pigmentum nigrum.

2. The vitreous humor is in a fluid state, perfectly pellucid, colorless, or slightly yellow. No trace of hyaloid membrane present.

3. Lens of yellow, or amber color, especially towards the center; its consistence firm; transparency perfect, or nearly so.

4. In the retina no trace of limbus luteus or foramen centrale.

He claims the first of these is responsible for the deep-seated opaque appearance of the glaucomatous eye, and regards it as a reflection of light from the retina, choroid and sclerotica, which is blue when it leaves the surface, but becomes green on passing through the yellow vitreous. Antonio Scarpa, the famous Venetian surgeon, had adopted a similar view, but assumed without proof that reflection is from the thickened retina, and regarded amaurosis as incurable when the fundus of the eye presents paleness inclining toward green. Scarpa wrote: "The retina of a sound eye is transparent; and therefore in whatever degree of dilatation the pupil may be, the fundus of the eye is of a deep black. The unusual paleness which accompanies amaurosis indicates that a remarkable change has happened to the substance of the optic nerve forming the retina, which by appearance has become thickened and rendered incapable of transmitting impressions of light" (20).

The preternatural firmness of the glaucomatous eye to touch, says MacKenzie, is due to over-distention of the tunics by aqueous fluid (a morbid secretion), consequent upon destruction of the hyaloid membrane, which in health secretes and absorbs vitreous fluid. He also notes, for the first time, that the lens frequently becomes opaque after glaucoma has continued for some time, and may occur suddenly or slowly, but is always a result of the disease, not the cause.

He outlines the symptoms of the disease as limited and sluggish motion of the pupil with other amaurotic symptoms; the pupil dilated and the retina insensible to light; loss of sight gradual, with total blindness probably the result of increased pressure. As given by the patient, the symptoms were fiery and prismatic spectra; misty indistinct vision, may be able to distinguish objects only on one side; may have pain across forehead which increases. It is often found after rheumatic symptoms as pains in the teeth and head.

The causes of the disease were put by MacKenzie in two groups; first the proximal causes, *viz.*, inflammation leading to the destruction of the hyaloid membrane; and increased pressure causing absorption of the pigmentum nigrum, rendering the retina insensible. The second

group, called exciting or predisposing causes, were; arthritis, which, as being very rare in persons under forty years of age while common in those over sixty (as was arthritis likewise) could almost be regarded as changes coincident with old age; others were possibly the use of tobacco and spirits, or the hard use of the eye on small objects. Scarpa, however did not regard the disease as of common occurrence but, on the contrary, thought it to be quite rare.

The prognosis as given by MacKenzie was rather hopeless. He says that it generally spreads to the other eye; is absolutely incurable in the full stage, but progress may possibly be checked by:

1. Bleeding and counter-irritation.
2. Calomel, opium, and mercury.
3. Rest eyes, mild diet, healthy skin, no alcohol or tobacco.
4. Belladonna drops morning and evening.
5. Puncture of sclerotica and choroid to relieve pressure of fluid. "The puncture should be made with a broad iris knife, at usual place of entering needle in operation of couching. The instrument should be pushed toward the center of the vitreous humor, turned a little on its axis and held a minute or two in the same position, so that the fluid may be allowed to escape."
6. Removal of the lens sometimes relieves pressure, but is not recommended because of possible infection and does not always help; of use only in the early stage. He cites a case of glaucoma in one eye which did not spread to the other, because the lens of the glaucomatous eye had been successfully removed for cataract.

The puncture of the sclera noted above was the first recorded operation for glaucoma, but MacKenzie makes no mention of its success or even of having tried the operation at all.

Other contemporaries of MacKenzie and Weller who did work on the subject, and who really deserve more credit than is given them here, were; Wenzel who, in 1808, first associated glaucoma with change in the retina as a nerve degeneration and separated it from gutta serena, Joseph Beer, who, in 1813, was the first to link glaucoma with arthritis and arthritic iritis; and Desmours who regarded sensitivity of the nervous system as a predisposing factor to glaucoma (21).

The last half of the nineteenth century is the most important period

in the development of scientific medicine as well as the most productive. For glaucoma it was an epoch-making era, in which our knowledge was immensely improved and increased. The literature of this period is so extensive that a complete review would require several volumes. We can only attempt to cover it in a superficial way by considering a few of the more important contributions.

The year 1851 was the turning point in the study of glaucoma as well as of all ophthalmology. This year saw the invention of the ophthalmoscope by Hermann von Helmholtz which revolutionized the study of the eyes and likewise opened a new world for the diagnosis of certain circulatory and nervous disorders. The idea of such an instrument was not a new one. Its value was realized before it was available and several devices of this kind had been previously essayed; but it was Helmholtz, not an ophthalmologist himself, who devised the first successful instrument, which proved to be the greatest single invention in the field of ophthalmology. It gave the inventor the record of having done more than any other man to promote the study of the eyes, a statement which is still true more than seventy-five years since.

The first and best description of the original instrument is that of Helmholtz himself in his "Beschreibung eines Augenspiegels" published in Berlin in 1851 (22). The description is too long to give here, but the following few sentences from the introductory paragraph give one a good idea of the way in which he approached the task; ". . . . The instrument has for this purpose two different problems to solve. First, everything which we can see in the background of the uninjured eye appears to us absolutely dark. The cause of this lies, as I will show, in the light-refracting media of the eye, which, under ordinary circumstances, hinder us from seeing illuminated parts of the retina behind the pupil. Therefore, the first question is to discover a means of illumination whereby exactly that portion of the retina on which we gaze through the pupil is adequately lighted. Secondly, we view the background of the eye only through refracting media. These, however, cast images of the retinal objects, which, in general, do not lie for the observer within the limits of plain vision. We need, therefore, together with the proper means for illumination, also further optical expedients which will render possible for the observing eye a correct accommodation for the objects which it should see."

The instrument has been greatly improved upon since its first appearance and now there are almost as many modifications on the market as there are types of automobiles; but all go back to the principle of Helmholtz' original which was to ophthalmology what anesthesia was to surgery.

The importance of this device in the study and early diagnosis of glaucoma is well known and cannot be stressed too much. One need only consider the great progress in learning and the increase in the volume of the literature which immediately followed.

Two of the first men to use the ophthalmoscope were Van Trigt and Coccius, both of whom, working independently, described the venous pulse of the eye in 1853, but neither connected it with glaucoma. Van Trigt explained the pulse as an emptying of the veins after each beat, and again filling, the phenomenon being due to increased capillary flow with each beat. He also said it was influenced by respiration and could be produced by pressure on the eye. Coccius (23) thought it was caused by pressure of the capsule of the eye on the vessels, and observed that it could be produced by compressing the sclera at the corner of the eye by a light pressure of the fingers.

The pulsations of the vessels were again described by Edward Jaeger (24) in 1854 along with other changes of the vessels, all of which he explained by a change in the optic disc. His explanation of the effect on the vessels is essentially correct, although he believed the disc to be bulged forward instead of cupped. In the following year, 1855, Donders (25) showed that arterial and venous pulse could be produced in the healthy eye by digital pressure.

The same decade that brought out the ophthalmoscope also covered the all-important work on glaucoma by Albrecht von Graefe (1828–70) of Berlin, the greatest of all eye surgeons and the creator of modern eye surgery. His first article on glaucoma (26) appeared in 1854 in the *Archiv für Ophthalmologie*, founded by himself in the same year. He described for the first time the arterial pulse in relation to glaucoma by saying (26) "In the arteries of the central part of the eye one notices nearly always in typical glaucoma a spontaneous pulsation." He knew that it could be brought on by light pressure of the finger on the eyeball in undeveloped cases, while great pressure was necessary in the normal eye. He observed the pulse to be later than the carotid and simultaneous with the radial. However, he also thought the

optic disc to be raised and said that in glaucoma the pulse could be seen on the edge, or "an den prominenten Hugel," while in the normal eye, when produced by pressure, it was seen on the whole optic disc. He thought the pulsation was due to the change in the optic disc and the increased pressure, which was quite correct.

Von Graefe's next and most important contribution to glaucoma was the introduction of the first successful operation for this disease, the iridectomy, which was described by him in 1857 (27). The cause of glaucoma was then thought to be chronic retinitis and choroiditis with subretinal effusions, but these were only present in the late and typical stages. He noticed the change in the optic nerve and drew attention to its effect on the vessels, but still thought the disc to be convex.

He divided glaucoma into three types:

1. The acute or inflammatory type in which all symptoms arise at once.

2. The chronic type where the change in the optic disc is first seen and the others follow.

3. Amaurosis with bulging of the optic disc and destruction of the optic nerve as the only lesions.

He assigned the cause of the hardness of the eye, which had long been observed, to the increased ocular pressure. He also described a flattening of the cornea due, he said, to: (1) Diminished convexity of cornea. (2) Iris more arched forward.

This von Graefe believed was good argument for increased pressure as well as the change in the vessels, the ciliary arteries first being injected, gradually diminishing, and the veins becoming large and tortuous. The course of the disease also reminded him of the blindness brought about by pressing on the eye, "deprivation of sight by compression." In spite of all this evidence he was held back in his idea of increased pressure by the belief that the optic disc was convex, but he was finally convinced that it was concave and was later confirmed in this by the work of Weber and Müller. However, he assured himself that this was only secondary by performing a paracentesis operation in a case of acute glaucoma, with temporary relief. He used this operation extensively, but records only two cases of permanent relief, the others being only of short duration.

Von Graefe knew the action of iridectomy on chronic iritis and various forms of irido-choroiditis, which he also treated in this way for the first time, and observed that the pressure was lessened, but he did not know how it would affect the glaucomatous eye or how long it would last; nevertheless, he tried the first iridectomy operation on glaucoma in June 1856. The results are well known. They were astonishing. The operation was entirely successful, as were later ones, and now for the first time in history there was a cure for glaucoma. The news spread rapidly and soon ophthalmological surgeons everywhere were performing the operation, while the originator was still in his twenties. Although other procedures have been developed since then, the iridectomy of von Graefe was used almost exclusively for fifty years, and to some extent is still practiced.

The complete effects of iridectomy and its exact method of working were not known by von Graefe. He thought it was probably highly compound, affecting circulation, secreting surface of the iris, and the muscular coöperation of iris and tensor choroideae.

The importance of an early operation was recognized by him; the earlier the operation, the more successful the results. He believed that every practitioner should be able to diagnose glaucoma and perform iridectomy, the latter being the easier. His greatest difficulty was much the same as that encountered today; the patient seldom came until one eye was gone and the other affected, which was especially true in chronic cases.

This great piece of work made the name von Graefe immortal. It was another stimulus to the production of literature on glaucoma, which has steadily increased up to the present time.

The cupping of the optic disc was first noticed by Adolph Weber in 1855, the year preceding von Graefe's first successful operation. He observed this in some experimental work, which three years later (1858), was confirmed by Heinrich Müller, who gave a long and complete description of a glaucomatous eye extracted by von Graefe. The cupping of the disc did not seem to attract Weber's attention as an essentially important matter, for he merely mentions it in a long article on experimental work by saying (28), "Careful and competent use of the ophthalmoscope will show the disc to be hollowed instead of bulging forward, as has been previously maintained."

About twenty years later, Weber also discovered the fundamental cause of glaucoma, namely, the closing of Schlemm's canal. Although his work on this subject was published in 1877 (29), the year following that of Knies (30) who put forward the same idea, the two worked entirely independently and were given joint credit for the discovery by the editors of the *Archiv für Ophthalmologie*, in which both papers were published. Weber was inspired in his work by the discovery of Leber (31), who had just previously found how the ciliary body excretes the intraocular fluid and its method of excretion; also by the results of Iwanoff and Rollet, who did much work on the anatomy of the iris and ciliary body. Weber's work consisted of extensive experiments with rabbits and dogs, in which he controlled the inflow and outflow of blood and lymph from the eyes as well as injecting various saline solutions into the blood stream and eye, producing by his experiments the exact symptoms and pathological changes found in glaucoma. He also studied and described the eyes of several patients who had suffered from the disease and decided the increased pressure to be due to swelling of the ciliary body, which pushed forward, decreasing Fontana's Space and thus preventing the escape of fluid *via* Schlemm's canal.

Max Knies (30) drew the same conclusions from a careful study of fourteen patients, whose clinical histories and pathological studies occupy the greater part of his article. It was published just before that of Weber, but after Weber's had been received by the publishers.

The work of Müller (32), appearing in 1858, shortly after Weber's announcement that the optic disc was excavated instead of bulging, cleared this question, once and for all, by conclusively showing that it did occur as such in glaucoma. This proof was given in a detailed pathological description of a glaucomatous eye extracted by von Graefe. In describing the optic disc he said (32), "It forms a cavity from whose edge the retina goes out perpendicularly. The wall of the cavity sinks from that above through the normal fibrous ring of the choroid which forms the rim and which in places is overhanging, while the cavity is concave towards the center. The depth of the cavity is about 1 mm. and sinks considerably below the choroid into the sclera. On the bottom of the cavity are the branches of the central vessels, the arteries and veins, which already begin to give off more branches

to the steep walls until they reach the edge of the choroid where the retina, in addition to the vessels, is formed by only a small amount of fibrous material. In the bottom of the cavity the vessels are placed somewhat loosely, here and there pigmented with unnamed cellular bodies scattered through the fibro-granular membrane. Behind it lies the considerably concave remainder of the lamina cribrosa." Since the appearance of this description, cupping of the optic disc has been one of the cardinal features in the diagnosis of glaucoma. The exact nature of this cupping is still in dispute. Some believe it is caused by the increased pressure on the weak lamina cribrosa, while others regard it as an atrophy of the nerve.

The next classical work on the subject was that of William Bowman (33) of London, eminent English physiologist and ophthalmologist, who was one of the earliest after von Graefe to perform the iridectomy operation and the first Englishman to take it up. Bowman realized particularly the importance of tension in glaucoma, giving an excellent means of estimating the pressure with the finger-tips and a systematic way of recording it. He called all undue tension of the eye glaucomatous tension, and realized the importance of immediate treatment and the disastrous effects of delay. He also warned against correlating the pressure with the condition of the vessels, since there could be a considerable increase in the pressure without any noticeable fullness of the vessels, redness of the eye, or effusion, while the opposite could likewise occur; thus, all these signs might be present without an increased tension, although the two were often and very likely combined.

In explaining his method of estimating the pressure, he says: "Both forefingers should be used together through the upper lid, which is to be gently closed. One finger steadies the eye by pushing against it with a suitable degree of force, while the other estimates the tension, or rather both together estimate it when thus used in concert. I tell the patient to close the eye gently as if asleep; and the fingers are then applied to the upper part of the globe, behind the corneal region. If the patient forcibly compress the lids, the mere action of his muscles may cause a momentary tension of the eyeball as well as interrupt the examination. If the eyeballs are deep set or small, the determination of the tension is less easy. With medical men the touch is already

an educated sense, and a very little practice will suffice to apply it successfully to the eye."

In recording the tension so determined, he used the capital letter T to represent tension; numerals following the T indicated the degree of increased tension, or if preceded by —, of diminished tension; the use of the interrogative ? indicated doubt. Using this system he distinguished nine degrees of tension as follows:

T_3	Third degree, or extreme tension. The fingers cannot dimple the eye by extreme pressure.
T_2	Second degree or considerable tension. The finger can slightly compress the coats.
T_1	First degree. Slight but positive increase in tension.
$T_1?$	Doubtful if tension increased.
Tn	Tension normal.
$-T_1?$	Doubtful if tension less than normal.
$-T_1$	First degree of reduced tension. Slight, but positive reduction.
$-T_2$ / $-T_3$	Successive degrees of reduced tension, short of such considerable softness as allows the finger to sink in the coats.

He also adds that normal variations must be kept in mind such as age, build and temperament of the patient.

Quite naturally there were many variations in this system as adopted by different men, but it was the essential procedure almost universally used until the invention of the tonometer offered a more accurate mechanical means.

The secretion of the aqueous humor by the ciliary process was first determined by Leber (31) whose work was published in 1873. Working with oxen, he found that this vascular body, lying just behind the iris, secretes the aqueous fluid which first goes to the posterior chamber, then to the anterior chamber, making possible a whole series of pathological observations. For instance, if the body of the pupil, or iris, prevented the passage of fluid into the anterior chamber, the ciliary body and iris would be pushed forward, the pressure of the eye increased and the optic nerve become atrophied. So far, he was correct, but he also thought that a part of the fluid filtered normally through the cornea, while the greater part was reabsorbed by the blood and lymph vessels. He made an extensive study of the vessels

of the eye and especially those of the anterior chamber, before he explained his theory of resorption. He did this in an extensive and plausible manner, but unfortunately, he was wrong. However, his work on the secretion of the ciliary body was what led Weber to disprove the second part (cf. page 155).

The use of miotics in the treatment of glaucoma was introduced in 1877 by Laqueur (34). He knew the fatal action of atropine from his own experience and that of others. In several cases of glaucoma in which atropine had been used, a chronic form of the disease suddenly became acute, while it had also been known to bring about glaucoma in an apparently normal eye. Consequently, knowing that physostigmine produced the opposite effects of atropine in other parts of the body, he decided to try it in an eye affected with glaucoma. In nearly every case, and especially in chronic forms, the patients were helped and some apparently cured. Laqueur also used muscarine with similar results. He explained its action as affecting the blood vessels in a manner analogous to that in the intestine in which the peristaltic movements were stopped by atropine and increased by physostigmine. Applying this to the blood vessels of the eye, he concluded that they were relaxed by atropine, thus allowing more blood to flow and increasing the pressure; whereas they were contracted by physostigmine, the blood supply was consequently reduced and the pressure lowered. Other explanations for their action have since been offered, but it is still not understood and his theory probably covers only a part of what takes place.

Since von Graefe's introduction of iridectomy, quite a number of other operations have been devised, and a few of the outstanding ones may be mentioned. The first substitute offered was that of De Wecker (35), in 1867, which he called 'anterior sclerotomy.' He did not perform the operation at that time himself, but suggested it and it was done by Stellwag the following year. De Wecker realized the importance of the filtering scar, or cicatrix, which, in his operation, were to be formed at the angle of the anterior chamber and allow the escape of fluids from the eye. This, however, was not permanent and he failed in his attempts to make it such. Nevertheless, it was successful to a large degree and is occasionally used at the present time to precede other operations. Writing on the value of iridectomy in

1901 (36), DeWecker advised that this operation be used along with iridectomy to replace the second operation.

Several operations were also devised combining iridectomy and sclerotomy into one. The best of them was that of Lagrange (37) in 1906, which he called the irido-sclerotomy operation. In this, an incision similar to that for iridectomy is made along the sclero-corneal line with a von Graefe knife. The conjunctival portion is then turned back and a small fragment of sclera is cut from this flap with scissors. A piece of the iris is then removed as in the iridectomy and the wound closed. A scar forms in the place of the small bit of sclera which was removed and permits the escape of fluid. This procedure was widely and most successfully used for several years. It was an improvement on anything offered up to that time and is still practised.

The use of the trephine had been attempted many times during this period, but it was not until 1909 that Robert Elliot (38) originated the most successful method in his sclero-corneal-trephine operation. The procedure here is to cut a triangular flap in the conjunctival layer of the sclera, fold this back, then with the trephine make a hole through the sclera into the anterior chamber. The wound is then closed and a permanent draining scar, or fistula, is obtained. This is the operation most extensively used at the present time and has rightfully placed its originator among the greatest ophthalmic surgeons of all time.

Dr. William H. Wilmer and other members of the ophthalmological staff of this Hospital use Elliot's trephine operation extensively, but Dr. Wilmer has introduced the Tenon's capsule graft in addition to the regular procedure (39). In this operation, Tenon's capsule is pulled downward and sutured over the trephine hole. By doing this he obtains good drainage and practically excludes the possibility of intraocular infection.

Two other operations are used extensively at the present time; *viz.*, the cyclodialysis operation of Heine, (40) introduced in 1905, and Herbert's small-flap sclerotomy described by him in 1911 (41). The former consists in detaching the ciliary body from the sclera in order to establish a communication between the anterior chamber and the supra-choroidal space, thus affording a means for reducing the tension. In Herbert's operation, a minute scleral flap is cut with a small knife or with Nauman's scissors, making in this manner a

filtering space. It requires a very delicate technique and for that reason is not used as widely as some others. Herbert reported 51 successful operations in a series of 54.

The following figures, compiled by Dr. Wilmer (39), give the percentage of success and failure in the most widely used operations:

OPERATION	PER CENT SUCCESS	PER CENT FAILURE
Iridectomy	63.3	36.7
Anterior sclerotomy:		
By various surgeons	72.8	27.2
By Lagrange	85.5	14.5
Trephine	72.0	28.0
	92.8	7.2
	77.6	22.4
Iris Incarceration	87.4	12.6
Small flap sclerotomy	73.2	26.7
Cyclodialysis	66.7	33.3

One most important detail not yet mentioned is the mechanical measurement of the pressure of the eye-ball. An instrument of this nature was long sought for and many attempts were made, but it was not until 1910 that Schiötz (42) introduced the tonometer, which has so justly made his name famous. The invention was rather skeptically accepted at first, but after a while it replaced the old finger-tip method of Bowman which had held sway for so many years, and now is a stock instrument in every clinic of ophthalmology.

The amount of work done in recent years on glaucoma has been enormous. No attempt has been made to cover it in any detail; I have only touched upon the "very highest spots," in a very general way.

The time has now come when glaucoma does mean blindness, but the percentage of operative failures is yet far too high. Perhaps the careful and scholarly theoretical work now being done on the subject will make possible the day when glaucoma will cause no eyes to be dim.

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WITCHCRAFT AND MEDICINE[1]

CHRISTIAN DEETJEN

Religion, medicine, and witchcraft form a trinity which is as old as the human race. It is impossible to separate them completely even to this day. Primitive man was constantly surrounded by inimical forces. The thunderbolt from the sky killed men and women while they sought protection under the trees from the downpour of rain; the cold of the glacial period drove them into the shelter of their caves; diseases decimated their number; wild animals devoured many of their tribe; and bad dreams disturbed their sleep. Is it any wonder that the people were early convinced that all their misfortunes were due to bad but invisible spirits, which conspired against them to make their existence miserable? And some of the tribe, perhaps a little wiser and perhaps a little more observant than the rest, formed some vague idea that those inimical spirits could in some way be induced to stop their baleful activities. They conceived the idea that by bribes and sacrifices they could be made to desist from harassing people. By slow evolution, by long observation, they often found a way to heal accidental injuries, to use certain herbs, to alleviate pains, and sometimes even to restore sick persons to health. In this way they became useful and important members of their tribe. In the course of untold centuries, these medicine men used their power gained by observation of the mysterious forces of nature, not only to cure various diseases and troubles but also to do harm, sometimes to revenge themselves upon their enemies and sometimes for personal gain. Perhaps they used poisonous herbs, perhaps they made men and women miserable through fear. And so malignant or "black" and benign or "white" magic were born. In later centuries, of course, both white and black magic were considered sinful, as both were proof of an alliance with the devil.

The literature of witchcraft is enormous. Volumes have been

[1] Read at a meeting of The Johns Hopkins Medical History Club on May 10, 1932.

written on its relations to religion and jurisprudence, but the relation of witchcraft to medicine has only been dwelt upon very recently.[2]

It is only the classical period of witchcraft of the 15th to the 18th centuries which we shall consider, and these briefly. To understand many phases, it is necessary to point out that there were always persons who absolutely believed that by supernatural means they were able to do good and also evil to their fellow men. It is further almost certain that for many centuries there existed a well defined cult generally called the satanic cult or satanism, in which the members—poor deluded people—made a pact with a man excelling in shrewdness, who appeared to them in various disguises as Satan himself and who promised them supernatural powers, for their fealty and services, to enable them to avenge themselves for real or imagined injuries on their neighbors. Without this, many acts in witchcraft can not be understood. Of course, the numbers of adherents of this cult were comparatively small and a very small percentage of them figured in the witch trials and the burning of nearly one million innocent victims.

The only reason why persecutions of witches were possible during so many centuries lay in the general belief in witchcraft. Not only the poor ignorant class of people, no, even the greatest savants, doctors and lawyers, kings and popes, all dreaded this awful sect of witches; the fear of personal injury through evil spirits was the root of persecution. It was only natural that everybody during those centuries was firmly convinced of the reality of a personal devil, of evil demons and, of course, of witches. It was no more than self-defense to prosecute and execute witches who continuously inflicted injury upon man and beast and even the crops in the fields. Furthermore, witches were heretics who mocked the Christian religion and were blasphemers. The priest preached against them in the church, the professors lectured against them in the universities and the law condemned them. The people had abundant cause to fear and hate the witches, for was not every known and unknown disease by them

[2] In the dissertion of Gerda Hoffmann: "Beiträge zur Lehre von der durch Zauber verursachten Krankheit und ihrer Behandlung in der Medizin des Mittelalters" (Berlin 1933), published after this paper was written, reference is made (p. 2) to the important work of Constantinus Africanus, who died in 1087, as the first writer on impotence produced by witchcraft.

inflicted upon the poor defenseless people? These diseases were of many kinds; body as well as mind were affected. We read mostly in those old books of diseases of the nervous system, both functional and organic; apoplexy and paralysis, partial and general, epilepsy, vertigo and comatose conditions were most common. So also were hysteria in all its manifold manifestations, St. Vitus' dance, insanity and so forth. A whole chapter could be written on the various anomalies in the sexual sphere; impotence, frigidity, sexual neurasthenia, sterility, even different forms of perversity are common afflictions caused by the devil and witches. Frequently we read of wasting diseases, lingering sickness and also of sudden deaths. An extremely interesting chapter is that on foreign bodies. The bewitched sufferers not only vomited pins, nails, stones, wood, feathers, and many other articles, but these same bodies would fester out of boils or escape from the healthy skin. We find the report of a rather peculiar case of bladder stones in a Swedish boy: it is entitled "An account of what happened to a boy 16 years old at Malmoe in the year 1678 supposed to be done by witchcraft, and attested by the ablest and most judicious men of that town:"

"Be it known, that during the Years 1678, and 1679, a very wonderful Thing happen'd in this City of Malmoe, to one of the Aldermen of the Town, his Name John Mechelburg, and his Wife's Abla Kruthmeyer; for God having blessed them with three Sons, one of them Abraham by Name, a Boy at this time aged about sixteen Years, hath been very strangely afflicted with a preternatural voiding of Stones, insomuch, that during the space of those two Years he hath, through the Virga of the Penis, voided several hundreds of Stones, great and small, which being weighed together, weighed no less than one and twenty Pound, Aver-du-poise, some weighing six, some seven, some eight, some nine Ounces, full of Angles, and much like pieces of a Rock that's broken by force, or Instruments fit for that purpose. These broken Stones sometimes came forth at the Boy's Mouth, sometimes he voided them by siege, and the Parents of the Child have confidently assured us, that before this Misfortune, the Boy had been Sick several Weeks together, and kept his Bed; during which Sickness something was seen moving in his Body, as if it had been some live Thing. After this Sickness, there appeared the Stones aforesaid; the

first that came forth exceeded not the bigness of half a Pea, but in a short time after they encreased to a greater bulk; when they were ready to come away, the Boy complained much of the Spine of his Back, where, as he said, he found incredible Pain. While this lasted he neither made Water, nor went to Stool sometimes in two Months, sometimes not in a quarter of a Year; sometimes the Stones, when they were pass'd through the Virga, appeared bloody, and upon one of them there appeared a kind of Talch. Notwithstanding all this misery, the Boy continued to eat his Meat very heartily, nor was he troubled with this Pain at all in the Night, but slept quietly, as he used to do. About the latter end of this unexampled Passion and Misery, a matter of sixty four Stones, for the most part small, came forth very fast one upon the neck of another, and since the 20th of September, 1679, this Misfortune hath totally left him, and he is as well as ever; nor is there after all those Torments any defect to be found, or perceived either in his Body, or the aforesaid Member of the Body, but he continues safe and sound unto this Day."

This testimony was subscribed to by a professor of medicine, a surgeon, and five ministers of the Church.

Many cases of blindness and other eye diseases are recorded. In the first work on ophthalmology printed in Germany in 1583 by the famous George Bartisch, Oculist and Surgeon, several chapters are devoted to diseases of the eyes produced by witchcraft. Permit me to quote one passage:

"Furthermore, as can be proved by Holy Writ, we have many other examples, some even of our own day, and similar ones may well happen in the future, that such wicked people, who were discovered to be the Devil's instruments or tools, have not only, at the instigation and with the aid of the Devil, bewitched other people and destroyed them, so that they became absolutely blind, but they have also, with the aid of their aforesaid accomplice, caused many poor people's eyes to swell and bulge out of their heads. Yea, what is still more dreadful and terrible, they have caused them to become halt, lame, deaf, dumb, and blind, and in some cases have caused them miserably to perish. On which account many of these sorcerers have been, on occasion, condemned by Christian authorities and the secular courts, and have been, as they deserved, executed, roasted, burned, and smoked—

these sorcerers having previously, with their own mouths, openly confessed and deposed their crimes, examples of which could here be cited if it were necessary.

Moreover, I personally have seen not a few of the people bewitched by the sorcerers in question, and have even had some under my care, and have cured them with the help of God—some of these poor people had been so evilly dealt with, that coals, hair, wood and iron came forth out of their festering flesh.

I have also seen with my own eyes, and know for a fact, that some people have been so injured, and even destroyed, as far as their eyes and sight were concerned, by witchcraft, that clasps, bent pins, buckle pins, and the like, festered out from their eyes; at times also pieces of flesh grew out of the eyes, in the shape of apples and pears, as can be seen in the following drawing."

Time is too short to speak of all the different diseases caused by witches. It may suffice to say that every known sickness of mind and body occurred and led thousands of innocent women to the stake. In the 16th and 17th centuries, when the plague killed almost a quarter of the European population, witch trials became more and more common. Is it any wonder that this awful scourge was also believed to be the work of the devil and the witches? I possess a report from Milan, printed in 1630, in which we read of the appearance of the Devil himself in the guise of a very rich gentleman; he was not treated as well as he expected and out of revenge sprinkled a great quantity of poison in the churches and streets and the next day 60,000 people died!

The devil and, through him, the witches employed different methods to inflict sickness. Not seldom they used real poisons. Remigius tells of a witch who was urged by the devil to kill her neighbor's child and as she did not succeed, he so tormented her that the mother compensated him by poisoning her own infant. Sometimes the devil punished the witch for not doing his wishes. Remigius also relates such a case: "The Demon put every pressure upon another witch to poison her husband. But when out of love of him she would not do his bidding, he was infuriated by her refusal and afflicted her with the dropsy; and she suffered from that swelling for six months and did not recover until her feet were lanced and eighteen pints of the most stinking matter were drawn off."

Das Dreyzehende Teil/

Wer kan oder mag nun ſagen / das ſolches ſolte von Natur ſein / vnd nicht von Zauberey herkommen? Demnach folget hie ordentlich/ wie man ſolches bey vnd an den Menſchen erkennen / curiren, heilen oder wenden ſol.

Es wird

Another witch case: "She was also guilty of the following crimes against John Ludovic, whom she hated for many reasons; as he was once crossing a river on his way to the mill, with the help of her Demon, she shook a large sack of wheat from his cart, and then sprinkled over his horses some poison powder which her "Little Master" had given her so that two of them died and the rest lingered for many days in a comatose condition. After several futile attempts in the end she killed John Ludovic with a poisoned pear."

The second and most common method of inflicting diseases was by magic words, incantations or touching with the hand, "the old damnum minatum et malum secutum—threats followed by injury."

An old English pamphlet gives a characteristic illustration for this method and besides has several other very interesting features. I quote literally from "Witchcraft, Farther Display'd, London 1712."

"An Account of the TRYAL of Amy Duny, and Rose Cullender, for Witchcraft, at the Assizes held at Bury St. Edmonds, in Suffolk, March 10, 1664 before Sir Matthew Hale, Knight, then Lord Chief Baron of the Exchequer.

"Amy Duny and Rose Cullender both of Leystoff, in Suffolk, were severally indicted for bewitching Elizabeth, Anne, and William Durent, Jane Bocking, Susan Chandler, Elizabeth and Deborah Pacey.

"When the Prosecutors were giving Directions for laying the Indictment, three of the afflicted Persons, *viz.* Anne Durent, Susan Chandler, and Elizabeth Pacey, fell into violent Fits, screaming in a dismal Manner; so that they were uncapable of giving their Evidence; and altho they did at length recover out of their Fits, yet they continu'd speechless till the Conviction of the Prisoners.

"The first Witness at the Tryal, was Dorothy Durent, who depos'd, That about the 10th of March, her Business calling her from home, she left her Child, William Durent, (then a sucking Infant) to the Care of Amy Duny for a few Hours that she was absent; but strictly charg'd the said Amy not to give it Suck. Being ask'd what need there was of that Caution, Amy being an old Woman, and uncapable of giving Suck? She answer'd, she knew she could not give Suck; but one Reason was, Amy had long had the Reputation of a Witch: Another was, it was usual with old Women, if they tended a sucking Child, and nothing else would please it, to give it the Breast, which

must be pernicious to the Infant, who suck'd nothing but Wind. She said farther, That when she came Home, Amy told her, that she had suckl'd her Child, contrary to her Orders. That upon this, she was very angry with Amy, who then threaten'd her in a great Rage, saying, "She had better have done something else, than have found Fault with her," and went away; and that very Night her Child was taken with strange and terrible Fits, and so continu'd for several weeks.

"The said Dorothy Durent farther said, that being full of Concern at her Child's Disorder, she went to one Dr. Jacob, who liv'd at Yarmouth, a Man famous for curing Persons bewitch'd. This Man advis'd her to hang the Child's Blanket all Day in the Chimney-Corner, and at Night to wrap her Child in it, advising her not to be afraid, if she saw any Thing in the Blanket, but take it and fling it into the Fire. She did so; and at Night, when she look'd into the Blanket, there fell from it a great Toad, which ran about the Floor. A young Man who was with this Examinant, catch'd this Toad, and held it in the Fire with a Pair of Tongs. Immediately it made a great Noise, to which succeeded a Flash like Gun-powder, follow'd by a Report as great as that of a Pistol; and after this, the Toad was no more seen, neither was its Substance perceiv'd to consume in the Fire.

"She said farther, that a Neice of the said Amy Duny, came to her, this Examinant, the next Day, and told her, that her Aunt (meaning Amy) was in a sad Condition, her Face being scorch'd with Fire, and that she was sitting alone stript to her Smock, without any Fire. That she, this Examinant, went immediately to Amy Duny, and saw her Face, Legs, and Thighs much scorch'd with Fire. That she ask'd Amy how she came in that Condition, Amy answer'd, She might thank her for it, she was the Cause of it; but she should see some of her Children dead, and go on Crutches herself. This Examinant said farther, that since the burning the Toad, this Child was well, and is yet alive."

A quite common and universally used method was the following: The witch or the sorcerer made a waxen image of the person, which was to be killed, and stuck through it a pin, uttering the same time some incantation like this, "With this pin I thee prick, My enemies' heart I hope to stick."

The third method of afflicting the poor victim is by obsession and possession. The Devil himself or the familiar of a witch enters the person bodily and tortures it most grievously. In these cases only the priest can help with his exorcism. There are many formulas to induce the Devil to leave his victim; for hours the proceedings are continued and if they do not avail, the priest (and I think that is medically interesting) resorts to potions of valerian or asafœtida, in German, "Teufeldreck," also incense burning and fumigation with the herb "Ypericon or Fuga Daemonum" *etc.*, to make it too unpleasant for the devil.

Perhaps here is the place to say a few words about drugs used in witchcraft. You know that the witches flew to their meeting places on broomsticks, pitchforks and so on. Before this ride they anointed their naked bodies with an ointment, given them by the devil. They all contain narcotics and other powerful drugs. We have several formulas which I copy from Miss Murray's book, "The Witch-Cult in Western Europe." The three formulas for the flying ointment used by witches are as follows:

1. Parsley or hemlock, water of aconite, poplar leaves, and soot.
2. Water parsnip, sweet flag, cinquefoil, bat's blood, deadly nightshade, and oil.
3. Baby's fat, juice of water parsnip, aconite, cinquefoil, deadly nightshade, and soot.

In addition to these drugs mentioned, there were a great many more in potions and powders prepared by witches to injure man and beast. But we also hear of a great number of mysterious remedies used constantly by physicians and also by the common people to cure those afflicted by witchcraft, and ward off evil spells.

Various herbs, minerals, different parts of animals and repulsive material from human beings, and also from corpses, were utilized in compounding these often horrible concoctions.

Now let us take a hasty look in the torture chamber for some medically interesting data. This poor victim is entirely nude, some women search her carefully for some devil marks. They find some fleshy pedunculated papillomata and pronounce them "teats" for the familar spirit to suck. They find warts: a needle is thrust through them; no blood ensues and no pain is felt! An absolutely sure sign

that the bearer is a witch. They find brown hairy moles, or some other brownish red or livid discoloration of the skin; the devil alone gave them to the witch when she was initiated. On that rack, a poor woman is stretched out, on her legs hang heavy weights; with flaming pitch she is burnt in her axilla; and see, she is asleep, she does not feel any pain, the devil is helping her! The judge knows nothing of catalepsy. This young witch tortured mentally and bodily, can not shed a tear, an infallible sign of witchcraft! They will all confess; they will all burn at the stake.

And how were the physicians of the time disposed to the question of witchcraft; did they believe in its reality? I have quoted George Bartisch oculist and surgeon, who never doubted the existence of a personal devil and witches. In fact physicians as a profession helped greatly to keep the belief in witchcraft alive. They almost invariably attributed to witchcraft the diseases which they in their ignorance could not explain and still less cure. In a London Hospital, in the 16th century, there were found 300 patients whose diseases were due to witchcraft.

A child suddenly became very ill and when Dr. Barrow, an eminent physician of Cambridge, who had treated the child without success asked the parents if witchcraft might be suspected; they promptly answered in the negative. In the Swedish report, just cited, it was a prominent physician who swore to the truth of bewitchment in the case of the boy.

In Salem, Massachusetts, in February, 1692, the witchcraft trouble started and the community became so aroused by the conduct of these "bewitched" girls that Dr. Gregg was called for a diagnosis, and he promptly declared the girls were "bewitched."

Nearly all physicians in cities and the country ascribed the origin of many sicknesses to the evil influence of witches. But learned, famous physicians and professors, also, were not free from this delusion. Paracelsus in Switzerland was steeped in a belief in witchcraft, and so was the eminent physician and mystic, Dr. Robert Fludd, in London, who believed that bad demons caused diseases and that the pious physicians had to fight against them. Dr. John Wierus devoted a chapter to the severe criticism of the ignorant physicians and surgeons who cover up their ignorance and their mistakes with

charges of witchcraft. He calls them "ignorant Knaves" (*ungelehrte Schlüngel*).

In the famous "Lancashire witch-trial of 1634," we find the name of William Harvey prominently mentioned; he was commissioned to instruct midwives to examine the accused women for "Devil marks" and was present at this examination, with six other surgeons. It is gratifying to learn that it was Harvey's evidence that helped to acquit the suspected witches. In this connection, we ought not forget the name of an able German physician, well versed in his art, who far in advance of his time, courageously spoke up against some aspects of witchcraft; it was John Weyer or Wierus. In 1568 he wrote his famous epoch-making book "De praestigiis daemonum."

It is not light reading for a student of our times but for the 16th century it was a real contribution and helped greatly to alter the conception of witchcraft for his successors. It is nevertheless disappointing in many ways. Nearly every page is a refutation and a contradiction of the preceding one. Full of superstition and a strong belief in a personal devil and witches, Weyer was yet fundamentally of a different belief from that of his learned contemporaries. In a few words, perhaps, I may put his doctrine in this way: There is no doubt that a devil exists, that he harasses people in mind and body; there are also witches and they, too, try to do harm with the help of the devil, but they can not produce diseases as is their belief; there are no bewitched people; their symptoms are only the effect of imagination, melancholia and hysteria. Witches ought not to be burned, as they are only more or less deranged women.

A few words about white magic. It was the universal belief that witches would not only do evil and harm their neighbors, but also in certain cases were able to cure diseases in which physicians had been unsuccessful. They also removed the spell from a bewitched person. Of course this—so-called white magic—was also considered sinful and forbidden, but very often these women were secretly consulted and were quite willing to aid the sick. They often possessed some knowledge of herbs, and sometimes, no doubt, really cured patients.

This white magic never has and never will die out. Many people who do not believe for a moment in witchcraft, still use white magic. Superstition born out of the old belief in witches, magic words, amu-

lets, peculiar remedies, and so forth, constitutes today a method of healing which is used by many thousands of people in every country. Often called "witchcraft and *Hexerei*" it is, in fact, not witchcraft at all; for, and this is most important, there is no abjuration and negation of God, and of the Christian religion. There is no adoration of a personal devil, there is no witches' Sabbath, and no Black Mass and obscene congregation of witches. Of course, superstition and confidence in the value of certain remedies often blend with the belief in witchcraft; and exorcism of possessed people is still legitimately practiced.

This belief in a personal Devil as the personification of all evil forces, as the tempter, the instigator of sinful deeds and immorality is, as you know, still held by millions of people.

Much more could be said about the medical aspect of witchcraft, but time is too short: About incubi and succubi, male and female lascivious spirits, about the issue of demons and witches, monsters, intestinal worms, metamorphosis in animals and so forth.

And here perhaps would be the place to go into the most interesting chapter of devil-lore, witchcraft and white and black magic of savage and half savage peoples, the aborigines of America, the blacks in Haiti, Africa and the inhabitants of Asia. There we find customs and beliefs almost identical with those in mediaeval times.

Let me close with a short passage from "Devils, Drugs and Doctors," which seems rather timely in these days of so many different superstitious healing sects:

"Thus when Mary Eddy assigned hysterical ailments to malicious animal magnetism and asked the courts of Salem, in 1878, to punish alleged persecutors, she was attempting to revive witchcraft and the punishment of witches. But along with this black magic she introduced white magic. The absent treatment she advocated was a phase of beneficial animal magnetism, that is white magic in contrast to the harmful black magic or witchcraft."

LeRoy Crummer
1872–1934[1]

The death of Doctor LeRoy Crummer on January 2, 1934, in the city of Los Angeles removes from medicine and medical history a figure of prominence. The setting of this world's reception of Doctor LeRoy Crummer was of a humble, quiet and pioneer character. Shortly after he was born and had gone to primary schools in Elizabeth, Illinois, his father, Doctor Benjamin Crummer, removed his small family to Omaha, Nebraska.[1] He had felt his need, there was no lingering spirit, it was one of hardihood and enterprise. It was in that spirit of Felix Platter who said "In this corner you are going to learn or die." This was to have a molding effect on his son.

LeRoy Crummer was forthwith sent to the University of Michigan for his B.A., and for his medical degree to Northwestern University. His father's dictum "Your first consideration is your patient" gave to LeRoy an added impetus to perfect himself in clinical medicine and carry it west again. He went to Germany, to the clinics at Heidelberg, Berlin and Munich, he was with Neusser in Vienna, he delved in history and psychiatry with Carl Jung at Zürich, he was in England with the cardiologists,—ten to fifteen years of his life. After the war in which he took an active part in the inspection of soldiers, he was made Professor of Medicine at the University of Nebraska (1919), a chair which he held until 1925. His health failed him and he left for California where he became the Professor of Medical History at the University of California and the University of Southern California. In spite of his confinement he was still spiritually aggressive and all of the students who had come in contact with him either in Nebraska or in the far west, felt the keenness of his ideas. He became part of their lives. As Christian Bay writes, "He had a decided *ingenium* for quickly perceiving essential facts and important traits in any field. His success as a diagnostician long ago had become assured.

[1] For a more complete Biography see that of Henry R. Viets in the New England Journal of Medicine, Vol. 210, pp. 389–392, February, 1934.

He had a peculiar light and almost whimsical method in anything he undertook, almost as if he were playing with his work." His work on "The Clinical Features of Heart Disease," is a masterpiece of clear writing and clear thinking. His edition of a manuscript by William Heberden, his work on the fugitive sheets in anatomy, his papers on cardio-vascular signs, the library which was the greatest private one west of the Mississippi and the keenness of his own mind portray his character. He used to say, "I deeply respect the physician who, when giving his clinic, restrains himself from the use of medical history, and I also deeply esteem the clinician who knows medical history so well, realizing that it is an active and determining part of the future of medicine, that he can give it in an epigrammatic way which will mean something to the student." He abhorred the dilettante. The whimsical and semi-sarcastic manner in which he would correct mistakes was an emphasis on his ideas of thoroughness. He could not understand how any physician would be happy without knowing not only the present status of medicine but the "Grundsubstanz," its history on which it was molded. When one would pick up in his library that rarity of rarities, Paré's "Universelle" and proclaim that it was only the second copy in the United States, his answer was, "You don't know a thing about it." Crummer could read both Greek and Latin and spoke French, Italian and German. His many visits to Europe during the summer vacations, travelling through Italy with three matchless companions: an Italian nobleman, a learned priest and an antiquarian bookseller, his associations with Garrison, Packard, Sigerist, Cushing, Welch, Klebs, De Lint, Sudhoff and others, the growth of his library of books and manuscripts, the development of his clinic, were to the student in the west an ideal. His books, the past of medicine, have gone to the University of Michigan. His students, those in the present, will carry on. His friends in Baltimore, those who have known him, will always remember him and it is with deep respect that they present their condolences to his wife.

M. P.

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TEXTS AND DOCUMENTS

GALEN'S "ADVICE FOR AN EPILEPTIC BOY"

TRANSLATED FROM THE GREEK BY OWSEI TEMKIN

The "Advice for an Epileptic Boy" was, according to Ilberg, a letter written by Galen not earlier than 190 A.D.,[1] a work, therefore, of the latter part of his life. We know no details about Caecilianus, the father of the sick boy, to whom the letter is addressed nor about Dionysius, the physician, mentioned in it. Since it serves practical purposes only, Galen's theoretical views on epilepsy are not explained, although to a large extent they form the scientific basis of his prescriptions. It may, however, be sufficient here to indicate that, according to Galen, epilepsy has its cause in the brain. When a thick phlegmatic humour assembles in its cavities, affecting the roots of the nerves and preventing the free passage of the psychic pneuma (an air-like substance supposed to effect the higher functions of the body), the phenomena of epilepsy follow. The disease may either have its origin in the brain directly or the latter may be affected from the stomach or any part of the body.[2]

Apart from the older Latin translations, a German[3] and an Italian[4] translation have been published in this century. This, together with the fact that the text of the Kuehn edition which I have followed[5] is far from satisfactory, made me doubtful about the value of my enterprise. But the renewed interest in the dietetic treatment of epilepsy may perhaps justify this attempt, since to the best of my knowledge the little work has never been translated into English.

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[1] Cf. J. Ilberg, Ueber die Schriftstellerei des Klaudios Galenos III (Rheinisches Museum 51, 1896, p. 183/184).

[2] Cf. Galen, De locis affectis III, Chapters 9–11. Cf. also A. J. Brock, Greek Medicine, London and Toronto, 1929, p. 220–225; and von Storch, An Essay on the History of Epilepsy. Annals of Medical History, New Series, Vol. II, 1930, pp. 614–650.

[3] F. Heller, Ueber Pathologie und Therapie der Epilepsie im Altertum, Janus, 16, 1911, p. 589–605.

[4] Augusto Botto-Micca, Il "De puero epileptico" di Galeno. Rivista di Storia delle Scienze Mediche e Naturali. Anno 21, Vol. 12, 1930, p. 149–169.

[5] Claudii Galeni opera omnia. ed. C. G. Kühn, Vol. XI (Lipsiae 1826) p. 357–378. I wish here to express my gratitude to Dr. Edelstein who gave me valuable advice and to my wife, Mrs. C. L. Temkin who corrected my English.

Dear Caecilianus,

I thought you would not need our advice for your boy's disease. Dionysius has already seen him and is about to sail back to Athens together with you. He is competent to do what is necessary while he is present, and to give new instructions according to the condition of the disease, when he leaves. I, however, who have never seen the boy might perhaps err very much since I was not acquainted with his original nature, and do not know how it has been affected by the disease. All I heard from you is that he suffers from epileptic paroxysms.

Now you probably think that negligence rather than the desire for truth makes me evade writing, a thing of which I have never yet been guilty. So, to please you, I am going to write down some advice on the treatment of an epileptic boy. The layman will, of course, inevitably misunderstand the meaning and blunder as to the due measure or the right time of application, for we have shown in other writings that it is not possible, without a thorough study of the therapeutic method, to cure any of the smallest diseases, let alone such great ones as epilepsy. Dionysius has already communicated with me and together we considered the whole treatment of the boy, before you urged the writing of these instructions. I easily explained my opinion to him, for he is able to follow what one says without misunderstanding anything, since he is sufficiently trained in the therapeutic method.

But I do not know how to go through the subject with you. For while that which is exact in it requires much elaboration and is too obscure for a layman, that which is concise and clear is, on the other hand, not exact. Thus I hesitated to write the instructions, much as I wished to please you. It seemed to me that I should suffer something similar to what Phidias would have suffered if, after creating the statue of Athene, he had been compelled to create a finger, an arm, a foot, the nose, an ear, and each of the other parts all separately. For I think, like a statue, the "therapeutic method"[6] has been created by me in several books, not, however, in a manner likely to help the layman or even the ordinary physician.

Since you, however, compel me to take one part of the medical art as

[6] Galen is obviously referring to the fourteen books of his θεραπευτικὴ μέθοδος a systematic book on therapeutics. Cf. also Ilberg, l.c.

my subject, separated from the harmonious union with the rest, I yield in obedience to the compulsion and write such instructions, as will be sufficient for you. For they suffice to prevent a layman, especially one who has in the usual way learned to be conversant with such writings, from making grave and irreparable mistakes in what the physicians prescribe. For physicians the treatise on the "therapeutic method" has been written; for you, however, and for the others who have a knowledge of some rational arts but are laymen in medicine, some advantage may nevertheless accrue, as I believe, from the present writing.

II

I shall try to go through as clearly as possible the manner of life by which the boy may benefit not a little and may suffer least harm from unexpected daily occurrences. These one must avoid as far as possible. Sometimes, however, he will necessarily encounter frost and violent heat, strong winds and strenuous baths, repulsive food and whirling wheels, lightning and thunder, sleeplessness and indigestion, distress and anger and weariness and similar things of which the chief characteristic is that they stir up and trouble the body violently, remind it of the disease, and produce a paroxysm. It is necessary to avoid these carefully, and if ever they occur and a paroxysm follows, then the boy must abstain completely from any motion, he must stay at home, and be put on a very light diet until the body throws off the fatigue resulting from the attack. I think you know what light diet is, and in any case, you will hear something about it if you read through the following. For now it is time for me to begin the prescriptions.

III

My instructions are to purge the boy moderately when spring approaches, for thus one may succeed in moving diseases caused by obstructions. Dionysius, who will be present, may take charge of it and regulate it. He knows exactly how to prepare the body for the purgation and what drug to use, and when; and he has already discussed the question with me. Thus in Athens you will have Dionysius present in the flesh and, together with him, my spirit and opinion

too. But after the purgation, when Dionysius has gone and the boy stays behind in Athens, you must put him on the following regimen:—

On rising from bed at daybreak, he should walk about in moderation and not very strenuously before joining his teachers. From then until it is time for the palaestra,[7] he should devote himself to his accustomed studies. As soon as he is released from them, he should walk again, making his way to the master of exercises. This man, of all the people who take care of the boy, has to be very thoughtful. It is, however, not very easy to find such a man, since he must be chosen from amongst those who are quite uneducated and whose souls are as donkey-like and stout as their bodies. Now do not pass this over lightly and do not entrust the boy to the first person you meet! You must have in mind that the main point of the treatment consists in these two things: the use of the drug I have given to you,[8] and the exercises. All other things are a kind of preparation for these. But Dionysius may help you in the choice of the master of exercises.

As regards the number of the exercises, the master must bear in mind to stop the boy before he becomes exhausted and, on the other hand, to make the whole body warm and adequately to rid it of superfluous substances.[9] But both demands should be fulfilled at the same time. For the moment that adequate excretion of the superfluous material has taken place the body has become sufficiently warm, and if at this moment the exercises are discontinued, one is just in time to prevent exhaustion. But exercises beyond this point affect the solid parts and melt down their shape; and the molten matter is collected chiefly in the joints and muscles. From this there follows impairment of the strength and thereupon a feeling of soreness when one endeavours to move any limb; this condition is fatigue. Therefore, the master of exercises must be not only prudent, but also well versed in moderate exercises. He must neither stop the exercises earlier than necessary

[7] The place where gymnastics and sports were practised.

[8] Galen refers to the drug made from squills, the preparation of which is described in the last paragraph.

[9] p. 362: *κενῶσαι*. This is based on the conception that superfluous materials (*τὸ περιττόν* or *τὰ περιττώματα*) engendered by food, indigestion, etc. play a part in the origin of diseases and ought, therefore, to be driven out.

for fear of the following weariness, nor must he drive the boy to fatigue in the desire to warm the body and to rid it completely of all the superfluous material. These are the chief points as regards the right number of exercises.

As to their character, one must try to strengthen all members and particularly the head and the stomach, and of the latter especially the parts around the cardia.[10] Now I shall tell you how one may attain this end. First, since strenuous exercises make the head full, I prescribe abstinence from them. Second, if ever it were necessary to use them, the lower parts should be moved, in particular the legs, the head being raised straight up. Third, in these exercises the master should begin with small, slow movements and thus lead up to more violent and quicker ones. It is extremely noxious not for weak bodies only, but for strong ones too, immediately to enter upon vehement exercises.

Believe me, too, rubbing is as good as exercise, especially for weaker bodies; and often the other drills are no longer necessary, if this alone has been administered properly. At first one must impart to the body a red appearance by rubbing downwards gently with muslin. One starts with the arms and hands, proceeds in the same way to the chest and abdomen, and then rubs the legs a little more in order to draw something from the upper parts of the body in this direction. Finally, one will attack the head, but it is dangerous to do so right at the beginning. For when the body is still full, the superfluous material is drawn to the part which is warmed first. Thus, as I have just said, the head must be rubbed last of all, when one does not use oil. But when one uses oil, there is no reason why one should not rub the head together with the other parts; so that one man may rub the head, two others the chest and the abdomen, and two others the legs. This method of rubbing all parts together should also be applied after the exercises and then especially, for thus the body sinks more quickly into repose and cools down less. If you pay attention to anything at all, you must do so to this.

It is usually better not to bathe and not to leave the palaestra immediately after the exercises. Rather, when breathing has become

[10] verbally: the mouth of the stomach.

calm and regular and when the excitement from the exercises has completely abated, one should rub the head energetically with the muslin and often even use the comb.

IV

After this the boy should go to lunch. Beforehand he should take something that evacuates the stomach; then he may eat some vegetables, or salted fish, or barley-gruel, or olives, together with a third of his daily ration of bread, laying aside the two other parts with the more substantial food for dinner. I shall tell you later on which the heavier dishes are, when I have first gone through all those one may take without harm.

As regards vegetables, I do not prescribe the avoidance of lettuce, or mallow, or orach, or blite altogether; but one should not always take the same, but rather eat moderately now of one, now of another. Beets and cabbage belong to the same category, for of these too one must partake moderately. It is wholesome to take a little leek and parsley and smyrnion[11] from time to time, and of tree-fruits those which are not entirely rough in nature and hard to digest. For such foods keep back their own superfluous materials as well as those of the other dishes. Black mulberries and the so-called "praecoccia"[12] and figs, and whatever is similar to these, pass through without causing harm; the so-called gourd is not inferior to any of the mildest vegetables, and the same is true of the melons too, whereas unripe cucumber is bad.

From time to time one must also allow the boy to take a bunch of ripe grapes, whereas he should seldom be given apples and pears and then very little, and they must have ripened well not only on the tree, but at home too after gathering. For, concerning tree-fruits suitable for storage, one ought to know that fresh ones are quite different from

[11] According to J. Berendes, Des Pedanios Dioskurides aus Anazarbos Arzneimittellehre in fünf Büchern, Stuttgart 1902, p. 308 the *σμυρνίον* is Smyrnium perfoliatum L. It is not always possible to identify the plants given by Galen with absolute certainty.

[12] p. 366: *τὰ πραικόκκια καλούμενα*. Heller, l.c. p. 600 interprets them as "frühreife Gewächse," I think rightly. It is probably a Greek rendering of the Latin "praecocia" derived from praecox.

old ones. Now one can store apples and pears and most tree-fruits, the so-called Damascus plums, and dried figs. Dates belong to the same category; I do not exclude them completely but they must be taken at the right time and in moderation.

Speaking generally, I recommend abstinence from daily or immoderate use of such food as engenders unhealthy humours, or as causes constipation or flatulence and is hard to digest. Such food, if taken constantly or more than is advisable at a time, usually causes harm not in this disease only but in all other diseases too.

Thus far the dietetic remarks would be equally valid for many other diseases; it is, however, peculiar and special to this disease that one must chiefly beware of food which engenders phlegmatic humours. Therefore, it is not good to partake habitually of things which, although harmless otherwise, have a viscous or cold or thick juice, such as orach, blite and mallow, and although I do not exclude them, I do not wish them to be eaten always. Gourds belong to the same category and cucumber, apples and pears even more so, and finally the so-called mushrooms, the worst of all foods with a phlegmatic, thick and viscous juice. From these I advise complete abstinence, just as from turnips and all other things with an edible root. For they have a thick juice and are on the whole hard to digest, except if they contain something sharp and warm, like parsnips and radish. The boy may taste radish from time to time, but he should try to abstain from parsnips and especially from turnips. He may have plenty of such food as contains something sharp and pungent, and which does not obviously engender bad humours nor has a smell which might affect the head. Those things, however, which by their heat make the head full, such as wine, mustard, parsley, parsnips, onions and smyrnion, belong to this class of exceptions. They overheat and engender unwholesome humours. Mustard, although very apt to separate the humours, must be avoided since it affects the head.

The boy should take vinegar-honey[13] with all confidence, even every day if he wants it. Capers can be taken with it and some salted fish, adding a little olive oil of course, as much as is necessary to make the dish pleasant. This dish is a kind of remedy for the disease, partic-

[13] The preparation is described in the last paragraph.

ularly if the vinegar has been prepared with squills, in which case people usually call it "scilleticon." Above all, I want him to take one of these two things each day, I mean to say, caper or salted fish with vinegar-honey. If, however, the boy also wants to drink vinegar-honey, it should be prepared beforehand (you will soon read how it has to be prepared) and not be mixed on the spur of the moment from the unmellowed ingredients. And it must be mixed with plenty of water, for in this way it becomes more pleasant. In winter it must be taken warm; in summer, however, nothing stands in the way of often using it cold, if the heat is excessive, the thirst great, and if the person is not entirely unaccustomed to cold beverages. For besides everything else, vinegar-honey, if not too sweet, quenches the thirst very well, and even better if it is mixed with cold water. To complete the cure of an epileptic boy, after the first purgation, it often sufficed if I prescribed the vinegar-honey and the use of the drug, without altering anything else in his old manner of life. But since I am not familiar with your son's constitution and am not going to take charge of him personally, and since I do not know how bad the disease is, I cannot predict how few remedies he may need and it seems better to me to discuss them all.

Thus, as I have said, after the exercises he should partake at lunch of vinegar-honey and eat some vegetables, olives, nuts, figs and dried figs—but not all of them together every day. He should rather take one simple dish; but I mention all of them, so that the diet may be varied. At this time, as has been said, the boy may also partake of the other tree-fruits, if he craves them. But otherwise it would be better to abstain from them, not only for the sake of curing the disease, but also in consideration of the whole state of health, as you see us too abstaining strictly from all seasonable food. But, it is true, we do not write about a healthy regimen for philosophers, as I should like best to do, nor, on the other hand, do we write merely for the cure of the disease, but also concerning the whole life of your boy. Now one must permit him to eat openly and at the right time things which do not cause great harm, lest he be harmed more by taking them secretly and at the wrong time. For people who are prevented from doing so openly, fill themselves with what they desire all at once and in a larger quantity. I prefer to concede to children many such foods as, although not beneficial, do not do much harm if eaten openly and at the

right time and with the necessary moderation, lest at the wrong time they might be compelled by the vehement desire to eat more and greedily. This should be the arrangement regarding the food.

V

After this the boy should have a short intermission and then I want him to walk about leisurely before resuming his studies. And after being released from these, I should like him to walk about again before dinner. Then he should eat the two parts of bread which were left, and of the other things according to the instructions. He may eat the meat of almost all birds except water-fowl. Above all, he must abstain from eating quadrupeds, but if at some time it be necessary to partake of them, he may eat the stomach of the domestic pig and such parts as are not fleshy, while of the wild pig he may eat the fleshy parts too. He may also have a taste of kid and hare. All these should be prepared simply or roasted without fat; "simply" means by way of water seasoned with dill, leek, oil and salt. You have seen at my house the earthen vessel in which to roast meat well without fat.

As regards sea-food, oysters are all bad; among fish, those living near the rocks are the best of all, but it will also be necessary to partake of those living in the open sea. The ray is almost the only cartilaginous fish which is suitable.[14] Among the plants with hulls,[15] husked barley stands first, lentils, wheat-groats and peas come next, while the others are bad. Generally speaking one must beware, as has been said before, of everything which causes viscous and thick humours, and flatulence and engenders superfluous substances and is

[14] p. 373: *ἡ νάρκη δὲ μόνη σχεδόν τι τῶν μαλακίων ἐπιτήδειος.* Dr. Edelstein was good enough to compare this passage with two manuscripts of the writing preserved in Rome. Although they confirm the reading given by Kühn, I have translated "cartilaginous fish" instead of *τῶν μαλακίων*. The Latin translation also renders this sentence as: Ex cartilagineo autem torpedo fere sola convenit. Aristotle (Hist. animal, 540b) numbers the ray amongst the selachia. A passage with Athenaeus, Deipnosophistae VII (314 d) proves that the ray was actually eaten in antiquity.

[15] p. 373: *ὀσπρίων δὲ πτισάνη* etc. *ὄσπρια* means leguminous plants, but since barley does not belong to them, Galen seems to have used the term in a broader sense different from that given by Theophrastus, Hist. plant. 8, I.

hard to digest. Oysters, cartilaginous fish, bulbous roots, snails, cheese, mushrooms, beef and boiled eggs are hard to digest and thicken the humours of those who eat them. Wheat-groats and pork engender good but viscous blood. All water-fowl, however, engender superfluous substances, while plants with hulls, especially beans and chick-peas, cause flatulence. Husked barley too, if not boiled diligently, causes flatulence, so that one must either boil it or not use it. If lentils are well boiled, the whole flatulent element is thrown off—but it is not good to take too much of them, since they engender a thick humour. These instructions are sufficient for the daily diet.

VI

After the purgation which I ordered to take place at the beginning of the spring, your son should use the drug prepared from squills which I gave to you. He should use it every day before leaving for the palaestra, and if the disease is not very severe and hardened, it may be hoped that it will cede completely in forty days through this drug; indeed I have cured innumerable children in this way without having to use hellebore. But it is necessary to drink wormwood once or twice after the purgation and before using the drug.

The sharpest vinegar-honey contains one part of vinegar to four of honey and the sweetest, one part to eight. The intervening degrees are determined in sharpness or sweetness by their proximity to one of the two extremes. But it must be boiled thoroughly, for thus both ingredients are properly united: the pungency of the vinegar is refined and the flatulent power in the honey is checked. The person who boils it must remove the foam completely. I know that in Greece and in most of the islands vinegar-honey is also prepared from honeycomb, and you may confidently use this kind too, especially in summer when the boy resides in Athens. However, it is not my business to determine at what time one ought to give it sweeter or sharper, with more or less water, and many other details. This rather is the concern of the man who is present and who sees the body under treatment, and is able to judge the condition of the humours. For with thick and viscous humours, one must use the vinegar-honey sharper and less mingled with water; otherwise, one must use it with more water and sweeter. In the same way, it is necessary to change and vary every-

thing else which has been mentioned, according to the daily condition of the body, as in all other diseases too. Wherefore, even if one wrote innumerable prescriptions for a man who is not exercised in the therapeutic method and hence skillful, one would not make him a capable physician, not even for one of the smallest diseases, let alone of the greatest! I have often shown this clearly by healing chronic ulcers and diseases of the eye with the same drugs as physicians had used before without success. According to Hippocrates, when the quantity of each drug has been determined according to its potency, the rest of the cure consists in its administration at the right time. And, as all the best physicians have agreed, the drugs are rather the means of assistance than assistance itself. Thus I finish the subject where I began it: the layman cannot handle the least thing well but needs the supervision of the expert.

Since, however, most people extract the juice of the squill badly, and since you wish to learn how I do it, I am going to add to this work the manner of its preparation. I take the honey vessel, as the Greeks call them, from which the honey has been emptied and I put in squills after having rubbed them into fine pieces between my hands. I cover it with a close-fitting lid and put a skin around the whole body of the vessel, fastening it carefully. Then I put it in a place facing the south and sheltered from the north winds, so that they cannot blow upon it. I do this at the time of the year believed by all Greeks to be the season of the rising of the dog-star. This season has forty days; twenty before the rising itself and the same number of days afterwards. During this period I sometimes gently change the position of the pot in order to get it warm on each side alike. At the end of this time, I unfasten it and then I find that the body of the squills looks as though it had been boiled in the vessel and some of the juice has come out. I take out the juice and sweetening it with the best honey, I administer one spoonful of it daily; a small one to children and a large one to adults. I also cut the body of the whole squills fine and, levigating it with honey, I give a spoonful of this too in the manner described. You must know that its potency is second to that of the above-mentioned juice. But those who boil the squills in water make them lose their potency, while those who prepare them with vinegar make the drug very strong but not harmless for the nerves.

NOTES AND COMMENTS

ON HIPPOCRATES

HENRY E. SIGERIST

One hundred years ago, in 1839, the French philologist and philosopher, Emile Littré, disciple of Auguste Comte, began publishing his edition of the Corpus Hippocraticum. He worked on it for more than twenty years. In 1861 the 10th volume was finally issued, completing this gigantic task.

This new edition revealed a new attitude towards Hippocrates. Although Littré had studied medicine, and although, in his preface, he expressed the hope that this new edition would be of profit to the medical profession as well as to historians, his approach to the Hippocratic collection was the critical approach of a philologist and historian.

For more than 2000 years the great figure of Hippocrates, the "Father of Medicine," had inspired the healing art. The works transmitted under his name had been copied and printed over and over again, for more than 2000 years. Medicine had progressed during that long period of time. Vesalius, Harvey, Morgagni and so many others had laid the foundations of a new system of medicine. The Hippocratic books were no longer textbooks. And yet the medical world still venerated them as you venerate your ancestors. The physicians still admired the keen sense of observation of the Hippocratic doctors, their sound judgment in evaluating symptoms of disease, their carefully balanced therapy. One felt a sentimental attachment to Hippocrates. He was still fully alive, so much so that in the beginning of the 19th century, at the reorganized medical school of Paris, a special chair was established for Hippocratic medicine and rare cases.

The French school flourished. The natural sciences developed by leaps and bounds. Scientific medicine made a splendid start and evolved with a speed unknown heretofore. The Hippocratic chair died a natural death. The time had come to look upon Hippocrates,

not as a demi-god, but as a 5th century B.C. Greek physician; to look at the Corpus Hippocraticum, not as on a book of revelations but as on a literary expression of 5th century Greece.

Emile Littré entered the scene. Applying the critical methods of classical philology, studying all the manuscripts known at the time, he endeavoured to restore the original text. Translating it into French he interpreted it. And in a series of splendid essays introducing the different treatises he wrote in a most scholarly way as many dissertations on the manifold and intricate problems of the Corpus Hippocraticum.

In this way Emile Littré created a definite picture of Hippocrates and Hippocratic medicine that has entered the textbooks and is well known to all who are familiar with the history of medicine.

The work initiated by Littré didn't stop. Much has since been written on Hippocrates and the Corpus. Right in our day we can witness a revival of interest in these problems. I thought that it might interest the readers of this Bulletin to hear what has been done on the subject in the last few years, how far our picture of Hippocratic medicine has been changed, what the present status of the problem is.

1

Who was Hippocrates? A well known physician, teacher of the healing art, an Asklepiad, born in Cos, who lived towards the end of the 5th century and in the first half of the 4th century B.C. This is all we know from contemporary sources, two passages in the Dialogues of Plato (Protagoras 311 b, Phaidros 270 c).[1] Centuries later, when Hippocrates occupied a central position in Greek medicine, legends arose around his name which like many legends may have had a certain foundation, may have been the final expression of old traditions. As long, however, as we have no authentic documents we will have to accept the legends for what they are, without attributing to them any biographical value.[2]

[1] To which we may eventually have to add an inscription in Delphi. Pomtov, Hippokrates und die Asklepiaden in Delphi, Klio, vol. XV, p. 144.—R. Herzog, Das delphische Orakel als ethischer Preisrichter, in E. Horneffer, Der junge Plato, 1922, vol. I, p. 164.

[2] Two papers on the legends concerning Hippocrates are being prepared by a member of our Institute, and will be published in later issues of this Bulletin.

Considering this very regrettable lack of sources we eagerly awaited the results of the German excavations carried out on the island of Cos, hoping that they would throw new light on Hippocrates and his activities. They did not, interesting as they are.[3] They proved that, contrary to the traditions, the cult of Asklepios was not brought to Cos before the middle of the 4th century B.C., that is to say, after the death of Hippocrates. The first altar was erected to Asklepios shortly after 350 B.C., and the temple built in the beginning of the 3rd century. All the stories about Hippocrates and his relations with the Asklepieion therefore, have to be banished into the realm of imagination. And this is probably true of the other stories as well.

The German excavations, however, brought to light more than twenty inscriptions concerning physicians, giving evidence of the flourishing condition of the medical school of Cos in the 3rd and 2nd centuries B.C., and of its relation to the Asklepieion. Rudolf Herzog believes that an inscription that he found should be considered as the sepulchral inscription of Thessalus, son of Hippocrates.[4]

We still know very little about Hippocrates. And yet, like the physicians of Imperial Rome, the doctors of our days want to know all about the life of the "Father of Medicine." Where there are no historical sources available, imagination will step in, and the poet will replace the historian.

In 1923 Georg Sticker published a German translation of Books I and III of the *Epidemics*, with an excellent medical commentary.[5] In the introduction he traced a picture of Hippocrates. Assuming that all the Hippocratic writings, in spite of all contradictions, were written by the same man—Hippocrates himself—he wrote a kind of fairy tale, charming in its naïveté, but having nothing whatever to do with Hippocrates.

[3] R. Herzog, Heilige Gesetze von Kos. Abhandl. d. Preuss. Akad., Phil.-hist. Klasse, Nr. 6, 1928.—Wunderheilungen von Epidauros, Leipzig, 1931.—Kos, vol. I, Berlin, 1932.—These very important books will be reviewed in a later article on Medical Archaeology.

[4] Die Grabschrift des Thessalos von Kos. Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 3, nr. 4, pp. 54–58, Berlin, 1933.

[5] Hippokrates. Der Volkskrankheiten erstes und drittes Buch (um das Jahr 434–430 v. Chr.). Aus dem Griechischen übersetzt, eingeleitet und erläutert, Klassiker der Medizin, vol. 28, Leipzig, 1923.

The same is true of another much more pretentious publication. It is rare to find an Inaugural-Dissertation on a best-seller's list. And yet this happened in the case of Gaston Baissette's "Hippocrate."[6] It was translated into German,[7] into Italian (1933), and an English translation probably will be unavoidable. A brilliantly written book, a "biographie romancée," a product of the "biographical industry." Doctors who are tired of reading detective stories before going to sleep will revel in reading this book. The author has collected whatever has been written on Hippocrates in the last 2000 years, and has read Littré's translation carefully. With this material in hand he has created a powerful story, a great picture of what an ancient doctor could have been. Why not? There is no harm in it as long as we are aware that we are reading fiction and not history. On the cover of the book the stoic philosopher Chrysippus is represented after the well known bust of the British Museum, which was formerly believed to be Hippocrates. We are glad to hear that the author's next two books will be real novels, and we certainly admire the liberality and the literary taste of the Medical Faculty that accepted this book as an Inaugural-Dissertation.

2

If we want to know what Hippocratic medicine was like we have to consult the Corpus Hippocraticum. The best complete edition still is Littré's edition.[8] Good as it is, it certainly has very serious deficiencies. It was a first attempt at a critical edition, and as such is necessarily imperfect. Littré based his text almost exclusively on the Paris manuscripts. But there are other very important manuscripts extant which are very helpful in elucidating obscure passages. It was to be expected therefore that new editions based on a broader manuscript foundation would be attempted. The most important of these undoubtedly was the edition of Ilberg and Kühlewein,[9] who succeeded

[6] Paris, 1931, Bernard Grasset.

[7] Leben und Lehre des Hippokrates, Stuttgart, Leipzig, 1932.

[8] Oeuvres complètes d'Hippocrate, traduction nouvelle, avec le texte grec en regard . . . par E. Littré, Paris, 1839–1861, 10 vol.

[9] Hippocratis opera quae feruntur omnia, rec. H. Kuehlewein (Prolegomena conscripserunt I. Ilberg et H. Kuehlewein), Leipzig, 1894–1902, 2 vol.

in improving Littré's text in many respects, but unfortunately never completing their work. A first volume was issued in 1894, a second followed eight years later in 1902, and then the publication stopped. It stopped because in the meantime the Academic Union under the leadership of Hermann Diels and the Prussian Academy had decided on the publication of the Corpus Medicorum Graecorum, a collection that was to include critical editions of all Greek medical texts that have come down to us. One of the most important items of the collection naturally was to be a new complete edition of the Corpus Hippocraticum.

One recognized that besides the manuscripts an extremely important source for the reconstruction of the text was to be found in the commentaries that Galen wrote to many Hippocratic treatises. The oldest manuscripts of Hippocrates that we have were written in the 10th century A.D. We do not know how old the manuscripts were that Galen used, but in any case they were 800 years older than ours, and therefore much nearer to the originals, so that Galen's text had to be considered very carefully.

But here enormous difficulties had to be overcome, because there was no critical edition of Galen which one could build upon. We are still using Kühn's edition,[10] which is anything but critical, and even worse than some of the Renaissance prints. Hence, before one could approach Hippocrates, one had to establish the text of Galen's commentaries by studying all the manuscripts of Galen. It was an extremely wearisome task. Some commentaries were preserved only in Arabic translations, and these, of course, had to be edited also. The work took more than 25 years, and is still going on.

Finally, in 1927, a first volume of Hippocrates was published in the Corpus Medicorum Graecorum.[11] It was to be the last word in Hippocratic "Text-Kritik," but it met with general disapproval among philologists. One important manuscript had not been consulted. The emendating hand, the genial approach required of the editor of such a text, were missed. Heiberg was a brilliant scholar who did splendid work in the field of Greek science and medicine.

[10] Claudii Galeni opera omnia ed. C. G. Kühn, Leipzig, 1821–1833, 22 vol.

[11] Hippocrates, Ed. I. L. Heiberg, Corpus Medicorum Graecorum, vol. I, 1, Leipzig and Berlin, 1927.

But he was old and sick while he worked on Hippocrates. He died soon after the publication of the book. The volume was a failure. There are rumors that it will be destroyed and redone. God only knows when the Corpus will produce its Hippocrates.

In the meantime, the Loeb Classical library issued a Hippocrates in four volumes.[12] It is also a critical edition. The text was revised and improved in some points by so able a philologist as W. H. S. Jones. The weak point of this edition is the absence of an apparatus criticus. The various readings of the manuscripts and the conjectures of former editors are indicated only occasionally when a passage is particularly controversial. According to the general plan of the series the editors endeavored to give the best possible text, yet without giving the reader a chance to form his own judgment.

The present situation as far as the text of the Corpus Hippocraticum is concerned is therefore this: whoever wants to study Hippocrates in the Greek original will still have to use the edition of Ilberg and Kühlewein, consulting at the same time the editions of Heiberg and Jones. A few single Hippocratic treatises have been edited separately, and the student of those will of course use these monographic editions.[13] All the newer editions mentioned so far are incomplete. For a large number of treatises we therefore have still to go back to Littré.

This situation is far from satisfactory. The imminence of the Corpus edition has paralysed the efforts of prospective Hippocrates editors for many years. But we cannot wait indefinitely, and I wish that the editors of the splendid collection Guillaume Budé would include a complete Hippocrates in their programme.

3

An ancient text that is of interest not only to the philologists, but also to the historians at large, and to the students of other disciplines, should always be accompanied by a translation. And who could

[12] Hippocrates, with an English translation by W. H. S. Jones (vol. III by E. T. Withington), London, New York, 1923–1931, 4 vol.

[13] Theodor Gomperz, Die Apologie der Heilkunst, Leipzig, 1910.—F. C. Unger, Liber Hippocraticus de Corde, Leiden, 1923.—Hippocratis de aere aquis locis, mit der alten lateinischen Uebersetzung hrsg. von G. Gundermann, Bonn, 1911.—G. Putzger, Hippocratis quae feruntur epistulae ad codicum fidem recensitae, Wurzen, 1914.—Axel Nelson, Die Hippokratische Schrift περὶ φυσῶν, Uppsala, 1909.

translate a text better than its editor, who has pondered the weight of every word, reflected about the meaning of every sentence? It is highly regrettable that the Corpus Medicorum Graecorum does not include translations. The cost of printing would have been considerably increased, to be sure, but the sale would have been so much larger that it would easily have compensated the cost. Important books like those of Aëtius of Amida have never been completely translated into any modern language. The wrong conceptions we have of Galen and his work are due chiefly to the fact that with the exception of a few treatises Galen's work has not as yet been translated.

The English reader will highly welcome the Loeb Hippocrates for the excellent translation it contains. These four volumes, handy in format, handsomely printed and well presented, ought to be in the library of every medical man. But just because such excellent work was done, I deplore the more that only parts of the Corpus Hippocraticum have been included in this edition. The treatises omitted, of which the more important are the Epidemics II, IV–VII, the 4 books on Diseases and the Gynaecological writings may be of less value, but the student of medical history cannot overlook them. They may not be of Coan origin, but they are important documents of Greek medicine as well as the others.

This omission is particularly serious because the translation of Francis Adams,[14] the only other translation available to English readers, is also not complete. Adams translated only those works which he considered genuine. Large and certainly not unimportant parts of the Hippocratic collection therefore are not available in the English language, and this gap is strongly felt by all those who are teaching medical history to medical students, and are endeavoring to have them read the sources at least in English translations.

I wish that the editors of the Loeb Classical Library would reconsider their decision. Two more volumes would complete the work and make an excellent job still better. A more detailed index would also greatly improve the usefulness of a translation which is often consulted for reference by medical students.

[14] The genuine works of Hippocrates, translated from the Greek with a preliminary Discourse and Annotations by Francis Adams, London, 1849, 2 vol., New York, 1929.

A good German translation of Hippocrates has also been wanted for a long time. There are a few old translations that are not so bad, the best of them being probably the one by Grimm.[15] It is difficult to find today and of course is obsolete in many respects. A more recent attempt was not very successful.[16] The translator, Robert Fuchs, a philologist, had the unfortunate idea of translating the ancient text into a modern pseudo-medical technical language which he hardly understood himself. Concepts of modern medicine were smuggled into the ancient writings, and the result was an entirely disfigured picture.

And yet in post-war German medicine, Hippocrates was in great favor for reasons that we will discuss in the last paragraph. A new translation was badly wanted by the medical profession, and was considered very seriously several times. However, it seemed frivolous to start such an undertaking just before the appearance of the new Corpus edition. One waited therefore. One waited and nothing was done. To comply with the demand of the medical public, several anthologies were published, of rather problematic value.[17] Had they been perfect they wouldn't have given what was really required—a complete German Hippocrates. It was finally realized that should the present generation obtain the translation it was asking for, one couldn't possibly wait very much longer. Better a Hippocrates with imperfections than none at all. It was good news to hear that the long-sought translation had materialized, and would be issued within a few years, although the publisher's announcement does not look very promising.[18]

[15] Hippocrates, Werke, übers. von J. F. C. Grimm, Glogau, 1837–1839, 2 vol.

[16] Hippocrates, Sämmtliche Werke, übers. von Robert Fuchs, München, 1895–1900, 3 vol.

[17] Hippokrates, Grundsätze seiner Schriftensammlung, ausgewählt und eingeleitet von Erich Ebstein, Leipzig, (n.d.)—Arnold Sack, Hippokrates, eine Auslese seiner Gedanken über den gesunden und kranken Menschen und über die Heilkunst, Berlin, 1927.—Karl Krayl, Hippokrates Brevier, Stuttgart, 1929.—A translation of *περὶ ἀέρων*, etc., was published under the title *Das Goldene Buch des Hippokrates*, übers. von Gerhard Jacoby, Stuttgart, 1930.

[18] Die hippokratische Schriftensammlung in neuer deutscher Uebersetzung. Unter Mitwirkung von G. Sticker, hrsg. von R. Kapferer, 7 vol., (25 parts), Stuttgart, Leipzig.

France has its Littré, which has become a classic. The translation has deficiencies, but is still a monumental piece of work that will not soon be supplanted. The original Littré was published in ten volumes, and although still obtainable, is becoming quite expensive. To reprint a revised edition of the translation was certainly an excellent idea, and the announcement last year was generally welcomed.

In the meantime two of the announced volumes have appeared.[19] It is hard to recognize the old Littré, dear to all of us. The new edition is apparently not intended for study, but as an ornament of the doctor's office. It is printed in the cheap, pretentious pseudo-bibliophilic manner that became so popular after the war. Prof. H. Roger, the venerated Honorary Dean of the Medical Faculty of Paris, wrote a preface and introductions to the different treatises. They are warmly written, and entirely unaware of the work that has been done in the field during the last hundred years. The translation has been revised, but by no means critically. None of the modern editions of the Greek text have been consulted.

The *clou* of this new Littré, however, is the illustrations. A bibliophilic edition obviously has to be illustrated. After all, it could have been done, by reproducing the well known illustrations of Apollonius of Kition, vase paintings and what-not. The publishers have preferred to have new illustrations especially made for the purpose, and the artist created a series of coloured pictures that would do honor to the *Vie Parisienne*, a display of Greek chorus-girls, darlings generously exhibiting their buttocks and other charms. The pictures are very well done, and as an album would meet with great popularity among hospital internes. Illustrating the "Father of Medicine," they are a disgrace, and show a lack of respect towards Hippocrates, Littré, and medical history at large, that cannot but be deplored.

I would strongly advise all those who haven't got a copy of the old Littré to secure one for themselves. The old, the real Littré was published by J. B. Baillière et Fils, 19 rue Hautefeuille, Paris, on ordinary paper—and is not illustrated.

[19] Hippocrate, Oeuvres complètes. Illustrations de Kuhn-Regnier, préface et commentaires du Professeur Roger, traduction de Littré. Paris, 1932–1933 (2 vol. issued so far).

4

We do not know which, if any, parts of the Corpus Hippocraticum were written by Hippocrates himself. Who then were the authors? What is the content of the collection? What were the concepts of the Hippocratic physicians, what their practical achievements? What diseases were they fighting?

These and many other intricate problems have preoccupied the Hippocrates students since the days of Alexandria. There are two main approaches to the subject, philological and medical. Before we can discuss the medical content of the different treatises we have to study them as literary documents of a definite period of Greek literature deeply rooted in their soil, and we have to apply to them all the methods of literary criticism.

The entire Hippocratic collection is written in the Ionian dialect, but it is obvious that there must be grammatical and stylistic distinctions among writings originating in various sources. By analyzing the style of different treatises, it should be possible to establish certain groups. Much work has been done on that line and more recently Margit Gutmann has written a dissertation on the dependent clauses in selected Hippocratic writings, and their importance for the problem of authorship.[20]

Numerous papers are devoted to the critical examination of single treatises. Max Wellmann[21] attributes περὶ ἀρχαίης ἰητρικῆς (On ancient medicine) to a Pythagorean physician, follower of Alkmaion. The ἀρχαῖοι ἰατροί to whom the author refers in his oration (ἐπίδειξις) as the founders of medicine are the Pythagoreans whom he attempts to defend against the dietetic views of the Cnidian school. In a short note dealing with the same treatise Karl Deichgräber[22] succeeded in improving the text by suggesting the reading (cap. 9,

[20] Margit Gutmann, Die Nebensätze in ausgewählten Schriften des hippokratischen Corpus und ihre Bedeutung für die Verfasserfrage. Inaug.-Dissertation, München, 1929.

[21] Max Wellmann, Die ps.-hippokratische Schrift περὶ ἀρχαίης ἰητρικῆς, Archiv für Geschichte der Medizin, vol. 23, 1930, pp. 299–305.

[22] Karl Deichgräber, Zu Hippokrates' περὶ ἀρχαίης ἰητρικῆς, Hermes, vol. 68, 1933, pp. 356–358.

p. 41, 21 Heiberg) of τοῦ σώματος τὴν διάθεσιν instead of τοῦ σώματος τὴν αἴσθεσιν, a conjecture which seems very good to me.

Two important monographs have been written on περὶ ἀέρων ὑδάτων τόπων (On Airs, Waters, Places) by two young philologists, Ludwig Edelstein[23] and Hans Diller.[24] Diller's is a thorough study on the history of the text, discussing the Greek manuscripts, the Latin translations, the oriental tradition. Galen's commentary on this treatise was lost in the Greek original, but preserved in the Hebrew translation. Diller gives a critical edition of the later Latin translation, and adds numerous valuable suggestions for the emendation of the Greek text, of which he promises a new critical edition. Further studies on the medical and anthropological content are also to follow.

Edelstein's approach is different. He starts by giving a careful analysis, making evident that the book consists of two entirely different treatises which have no connection whatever; one, cap. 12–24, being a comparative anthropology of Asia and Europe, while the other, cap. 1–11, is considered a prognostic treatise instructing the physician who comes to a region unknown to him, how to observe the surroundings and to draw conclusions from them as to the nature of the diseases prevailing in such a place, so that he may know all about the patient right away, without asking questions. Edelstein believes that this first treatise is not homogeneous either, but that cap. 7–9, on waters, are interpolated from an otherwise lost treatise, περὶ ὑδάτων, a point in which I cannot follow him unrestrictedly.

Edelstein's conception of περὶ ἀέρων is highly original, and this first chapter of his book became the starting-point for very important investigations on Hippocratic prognostic, the Hippocratic physician, and the Hippocratic question as a whole, to which I will have to return in the next paragraph.

Geographic observations and conceptions in the Hippocratic collections are the subject of a dissertation by Gerhard Jacoby.[25]

[23] Ludwig Edelstein, περὶ ἀέρων und die Sammlung der Hippokratischen Schriften. Problemata, Forschungen zur klassischen Philologie, no. 4, Berlin, 1931.

[24] Hans Diller, Die Ueberlieferung der Hippokratischen Schrift περὶ ἀέρων ὑδάτων τόπων Philologus, Supplementband XXIII, no. III, Leipzig, 1932.

[25] Gerhard Jacoby, Geographische Beobachtungen und Anschauungen im Corpus Hippocraticum. Inaug.-Dissertation, Jena, 1928.

The famous treatise *περὶ ἱερῆς νούσου* (on Epilepsy) has recently been the subject of two papers. Max Wellman[26] attributes the treatise to a physician who belonged to the school of Kroton, or to the Old Cnidian school, which was very closely connected with Kroton. The author, according to Wellmann, was a follower of Alkmaion, who reproduced his master's views on the physiology of the brain. He wrote this treatise in his youth, and later, after having travelled all over the world, wrote *περὶ ἀέρων*. In opposition to Wilamowitz and Regenbogen, Wellmann assumes that the chapters 14–17 are not interpolated but are an integral part of the book, a conclusion that was shared by Owsei Temkin.[27] Temkin gives a very thorough philological and medical analysis of the treatise, and shows that it was written by a physician for laymen. The purpose was to enlighten people as to the nature of epilepsy, to demonstrate that this disease was not more sacred than any other disease; that it was curable by drugs and especially by diet, but that the treatment had to begin early. Temkin did not restrict himself to this one treatise, but examined all passages of the Corpus on epilepsy and in this way succeeded in giving a comprehensive picture of what the Hippocratic physicians knew and thought about the disease—what they called it and how they treated it.

Among the many Hippocratic writings, the Aphorisms undoubtedly became by far the most popular books: printed, translated, and commented upon endless times, they were the doctor's bible for many centuries, and often referred to by the laymen. But this popularity was acquired relatively late. Ernst Nachmanson[28] searched the non-medical ancient literature for references to the Aphorisms and found remarkably little.

That the Aphorisms still have a strong appeal to the philosophically-

[26] Max Wellmann, Die Schrift *περὶ ἱρῆς νούσου* des Corpus Hippocraticum, Archiv für Geschichte der Medizin, vol. 22, 1929, pp. 290–312.

[27] Owsei Temkin, The Doctrine of Epilesy in the Hippocratic Writings, Bulletin of the Institute of the History of Medicine, The Johns Hopkins University, vol. I, 1933, pp. 277–322.

[28] Ernst Nachmanson, Zum Nachleben der Aphorismen, Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 4, no. 1, Berlin, 1933, pp. 92–107.

minded physician, that they still provide food for reflection, becomes evident from several papers of Richard Koch[29] in which he endeavors to interpret the first three Aphorisms and reflects about the causes of the fame of the Aphorisms in various periods of history.

Since Pétrequin's classical book on Hippocratic surgery[30] very little has been done on the surgical writings, just as the gynecological treatises have been utterly neglected. We welcome therefore the study of W. Schleiermacher,[31] although the results are not particularly exciting. The author examines the composition of *περὶ ἀγμῶν* (on fractures), and *περὶ ἄρθρων* (on joints). Both were not originally independent writings, but parts of one larger surgical book beginning with the words *τάδε ἐς χειρουργίην κατ' ἰητρεῖον* while the treatise, transmitted under the very inadequate title *κατ' ἰητρεῖον* represents a mere abstract from the original book. The titles *περὶ ἀγμῶν* and *περὶ ἄρθρων* were given to the respective treatises by a late editor (between 200 and 150 B. C.) who edited those sections of the original work separately, more or less preserving the order of the chapters, but changing the beginning of *περὶ ἀγμῶν* and the end of *περὶ ἄρθρων*.

It created quite a sensation when W. H. Roscher, in several most fascinating publications,[32] declared the treatise *περὶ ἑβδομάδων* to be the oldest document of Ionian philosophy. Roscher's ideas were violently opposed at the time by Diels, Boll, Ilberg and others. Now, in a recent publication Max Wellmann,[33] who smells Pythagoreans

[29] Richard Koch, Auslegung des ersten Hippokratischen Aphorismus, Historische Studien und Skizzen zur Natur- und Heilwissenschaft, Festgabe Georg Sticker, Berlin, 1930, pp. 1–10.—Auslegung de szweiten Hippokratischen Aphorismus, Festschrift Max Neuburger gewidmet, Wien, 1928, pp. 209–218.—Auslegung des dritten hippokratischen Aphorismus, Archiv für Geschichte der Medizin, vol. 26, 1933, pp. 281–288.—Warum kamen die Hippokratischen Aphorismen zu klassischer Bedeutung? Münchener medizinische Wochenschrift, vol. 80, 1933, pp. 189–191.

[30] Chirurgie d'Hippocrate, par J. E. Pétrequin, Paris, 1877–1878, 2 vol.

[31] W. Schleiermacher, Die Komposition der Hippokratischen Schrift *περὶ ἀγμῶν-περὶ ἄρθρων ἐμβολῆς*, Philologus, vol. LXXIV| (N. F. vol. XXXVIII), 1929, pp. 273–300, 399–429.

[32] Die Hippokratische Schrift von der Siebenzahl in ihrer vierfachen Ueberlieferung, zum erstenmal herausgegeben und erläutert von W. H. Roscher, Paderborn, 1913.

[33] Max Wellmann, Die ps. hippokratische Schrift *Περὶ ἑβδομάδων*, Quellen

everywhere, and has a mania for ascribing every anonymous treatise to a well known name, has attributed the treatise to a Pythagorean physician of Cyrene, a follower of Proros of Cyrene, and a student of the Cnidian school. Wellmann's arguments are far from convincing, and *περὶ ἑβδομάδων* is still one of the most puzzling writings of the Corpus; one that certainly has to be approached from an entirely different angle.

The Pseudo-Hippocratic Epistles included in Littré's edition, and re-edited by Putzger[34] are interesting documents of the Hippocrates legend. The Codex Urbinas 68 contains as epistle 19, an otherwise unknown *λόγος περὶ λύσσης* (treatise on rabies), which H. Diels believed to be part of the epistle *περὶ μανίης*. H. Diller,[35] examining the text, came to the conclusion that the addition of Codex Urbinas is not ancient at all, but the work of a humanist imitating the Hippocratic style.

5

Another set of problems is attacked as soon as we begin examining the so-called Hippocratic Oath, and the other deontological writings, the problems concerning the medical profession in Hippocratic time.

Karl Deichgräber wrote a very illuminating paper on the ethical conceptions in the Hippocratic Oath.[36] He starts by giving an excellent new German translation of this undoubtedly very old document, and then proceeds to analyze it. The first part of the document following the invocation to the gods is an indenture, a contract between master and pupil. In ancient times medicine was a sacred lore of certain families transmitted only from father to son. As time went on, students from outside the family were admitted. What the first

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und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 4, no. 1, Berlin, 1933, pp. 6–10.

[34] G. Putzger, Hippocratis quae feruntur epistulae ad codicum fidem recensitae, Wurzen, 1914.

[35] H. Diller, Die sogenannte zweite Fassung des 19. Hippokratesbriefes, Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 3, no. 4, Berlin, 1933, pp. 35–44.

[36] Karl Deichgräber, Die ärztliche Standesethik des hippokratischen Eides, Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 3, no. 2, Berlin, 1932, pp. 29–49.

part of the Oath, however, teaches us, is that these outside students were, so to speak, adopted into the family. They assumed all the rights and duties of family members. While the first part of the Oath is the result of peculiar historical conditions, the second part postulated the general duties of the physician towards society. Some of these duties are in accordance with the general ethical conceptions of contemporary Greek society. The physician who faithfully complies with them will increase his reputation (δόξα) and will strengthen the public's confidence in the profession. Some of these duties, however, according to Deichgräber, require much more of the physician than would be expected from an average citizen and professional man. Yet we must not overlook the fact that with one exception all these regulations are mere prohibitions. They do not state what the physician ought to do in order to be a good doctor, but they indicate the actions from which the physician should abstain, what δίκη forbids. Only one paragraph, "I will keep pure and holy both my life and my art," is a positive pledge.

The Oath certainly is a great document—its influence, if anything, proves that sufficiently. Yet when we examine it critically, and we have to do so as historians, we will find that utilitarian motives are far from absent. And after all, what is the ultimate goal? What is the physician seeking for, who keeps his Oath loyally? Reputation. "Now if I carry out this oath and break it not, may I gain for ever *reputation* among all men for my life and for my art." The gain of reputation, however, is certainly not the highest ideal we can conceive.

Hippocrates, in the course of the centuries, became the "Father of Medicine," an ideal figure. And yet he and his contemporaries were human, very human beings. They had to make a living, they sold their services, and the man who worked for money was not highly esteemed in Greek society. We think of the Hippocratic physicians as worthy bearded old gentlemen uttering weighty wisdom, just as we cherish a sentimental picture of the family doctor of old. Bearded they were, the Hippocratics, to be sure, but otherwise we must imagine them as acting very much as the people do today, who are living near the Orient. And we know positively that many of them were shrewd fellows.

We are much indebted to Ludwig Edelstein for bringing our views

nearer to reality. Being a philologist and not a doctor, he was not burdened by 2500 years of professional tradition, and could read the Hippocratic writings much more objectively. I mentioned his book before.[23] Having found that the treatise on Airs, Waters, Places, had a prognostic character, he naturally became interested in prognosis. Why did Hippocratic medicine emphasize prognosis to such an extent? But before this question could be answered, another had to be raised: what were the conditions of medical practice in Greece?

The Hippocratic physician was a craftsman, was educated as such and, as a rule, practised his τέχνη, his craft while wandering, like other craftsmen, the shoemaker, the blacksmith, the artist. Only larger communities had their permanent municipal physician whose salary was raised through a special tax. In smaller towns medical service was given exclusively by the wandering physicians. When such a doctor came he knocked at the doors, offering his services like other craftsmen, and where he found sufficient work he rented a shop, the iatreion, and settled down for a while. The physician, as a rule, was unknown to his patients. There was no license guaranteeing a certain amount of knowledge. Everybody could call himself a physician and take care of patients for money. For a doctor who came to a town as a stranger, the best and shortest way to acquire a reputation and to gain the confidence of the people, undoubtedly was to make correct prognoses. This the patient and his family could check. A physician who could tell right away what was wrong with a patient, and what would happen to him, could not but impress the people if his prognosis proved to be true. These peculiar conditions of medical practice in ancient Greece would explain, according to Edelstein, the central position held by prognosis in Hippocratic medicine.

I think that there are other reasons besides this, which have to be sought in the structure of Greek medicine, in the Hippocratic concept of disease. Nevertheless, Dr. Edelstein has advanced our knowledge tremendously, and we will have to reconcile ourselves to the fact that the Hippocratic physicians were no demi-gods, but just humble mortals, seeking the truth; erring, rejoicing and suffering like ourselves.

6

In antiquity it had already been noted that the different treatises of the Corpus Hippocraticum could not possibly have been written by one man. They were found to be different in style and concept, sometimes even antagonistic. The question, therefore, was, which are the "genuine works of Hippocrates," and which the pseudo-Hippocratic? As was said before, it was relatively easy to delineate certain groups of writings. There were definite indications as to which treatises had originated in the school of Cnidos. Those opposing them in all probability had to be Coan. One treatise bore the mark of origin in its title, the Coan Prognoses. Hippocrates being a Coan naturally had to be connected with this group. It became customary to attribute to Hippocrates those Coan treatises which seemed the best, which appealed most to the medical man. They were considered the "genuine works," while the minor writings had to be the work of pupils.

A real blow was the discovery of the so-called *Anonymus Londinensis*,[37] a collection of medical abstracts compiled by a pupil of Aristotle, Menon, who attributed views to Hippocrates similar to those found in *περὶ φυσῶν* (on winds), a treatise that was generally considered as decidedly pseudo-Hippocratic.

Ludwig Edelstein demonstrated very convincingly—and this is the last chapter of his book[28]—that we have no possibility whatever of attributing any definite writing to Hippocrates. We know nothing about Hippocrates' literary activity. To connect him with any treatise is mere guess-work. But then, why was the Corpus called the Corpus Hippocraticum? Why were all these treatises attributed even in antiquity to Hippocrates, and not to Herodikos, or Euryphon or any other doctor? What was the process?

According to Dr. Edelstein it was this: to his contemporaries Hippocrates was not a particularly outstanding figure. He was a famous physician and teacher of medicine—among many others.

[37] Anonymi Londinensis ex Aristotelis Iatricis Menoniis ed. H. Diels, Supplementum Aristotelicum III, 1, Berlin, 1893. There is a German translation of it by Heinrich Beckh and Franz Spät, Anonymus Londinensis, Auszüge eines Unbekannten aus Aristoteles-Menons Handbuch der Medizin und aus Werken anderer älterer Aerzte, Berlin, 1896.

Little was known about his life and work, otherwise the references would not be so scarce.

The early Alexandrian physicians became interested in the history of medicine. In a very important testimony of that time (Skolion to Ilias, 11, 515) it is said that dietetics were inaugurated by Herodikos and were brought to perfection by Hippocrates, Praxagoras and Chrysippus. Herophilus was a student of Praxagoras of Cos, Erasistratus a student of Chrysippus of Cnidos. Hippocrates, Praxagoras and Chrysippus were mentioned together as the three leading men in the field of dietetics. Hippocrates, however, was the senior of the three.

The Alexandrian library contained many 5th and 4th century medical books which must have been anonymous at the time they were brought to Alexandria. As soon as the interest in Hippocrates was aroused, the Alexandrian physicians and philologists endeavored to ascertain which of the anonymous books could be the work of Hippocrates. In this way a nucleus of Hippocratic writings was formed.[38]

As time went on, the fame of Hippocrates increased. To Celsus, whose work reproduces late Alexandrian knowledge, he appears not as the man who brought Dietetics to perfection but as the oldest medical writer (vetustissimus auctor), as the first of all worth being remembered (primus ex omnibus memoria dignis, I, 18. 12–13). It is obvious that more and more anonymous treatises were now ascribed to him.

This process continued, Hippocrates was more extensively heroized. To Imperial Rome, the 5th century B. C. was the Golden Age of Greece, the time of the great classics, and Hippocrates was one of them. Erotianus considered him a writer ranking with Homer. He represented Galen's ideal of a physician.[39] He now was the "Father

[38] We know the names of the first editors, see Max Wellmann, Hippokratesglossare, Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 2, Berlin, 1931.

[39] See Ernst Wenkebach, Der hippokratische Arzt als das Ideal Galens, Neue Textgestaltung seiner Schrift "Οτι ὁ ἄριστος ἰατρὸς καὶ φιλόσοφος, Quellen und Studien zur Geschichte der Medizin und der Naturwissenschaften, vol. 3, no. 4, Berlin, 1933, pp. 155–175. See also Hans Diller, Zur Hippokratesauffassung des Galen, Hermes, vol. 68, 1933, pp. 167–181.

of Medicine," and the entire medical literature of the Golden Ages was naturally attributed to him, although more critical minds had their doubts as to the genuineness of some of the treatises.

Edelstein's conception is a hypothesis, to be sure. There can be no certainty when the material is so scant, but to me it is the most illuminating hypothesis on the subject ever professed, and I consider Edelstein's book the most important contribution to the Hippocratic problem since the time of Littré.

Edelstein's book naturally met with great opposition. What he had said was so bewilderingly new, so much out of the traditional line, that it required a considerable effort of thinking on the part of philologists as well as medical men. I shall always remember the evening in 1930 when Dr. Edelstein delivered a lecture on his investigations at the Leipzig Institute of the History of Medicine. He spoke for two hours, without manuscript, without a single note. The entire audience was entranced. The youngest student felt that he had heard a very unusual talk, and old philologists present at the meeting paid their tribute to their young colleague. Later, however, after the publication of the book, the attacks came. The reviews were uneasy and sceptical. The medical reviewers saw an iconoclast in Edelstein. The philologists, fearing that they would have to revise their theories, expressed their disapproval in general terms, and attacked him on minor points.

Whoever wrote on Hippocrates in Germany from 1931 on, had to consider Edelstein's work. The most important contribution from the other camp was issued a few months ago, a large monograph of Karl Deichgräber's, on the Epidemics and the Corpus Hippocraticum, a preliminary study to a history of the medical school of Cos.[40] It is very easy to review Edelstein's book, as it is written in a style as clear as crystal, but it is difficult to give an adequate picture of Deichgräber's study in a few lines. It is written in philological German, and has to be read with the texts in hand. The parallelism between the two studies is striking. Edelstein's starting point was

[40] Karl Deichgräber, Die Epidemien und das Corpus Hippocraticum, Voruntersuchungen zu einer Geschichte der koischen Aerzteschule, Abhandlungen der Preussischen Akademie der Wissenschaften, Jahrgang 1933, Phil.-Hist. Klasse nr. 3, Berlin, 1933, 172 pp.

the treatise on Airs, Waters, Places. From there he discussed the whole set of problems. Deichgräber started with the Epidemics and was also induced to deal with the general problems of the Corpus. The results are very contradictory.

Deichgräber aimed at what the students of Hippocrates had done for centuries, namely, at a grouping of the different writings, attributing them to definite periods, schools, and eventually to individuals. The result of the first part of his study is that Epidemics I and III, which had always been recognized as belonging together, were written at about 410 and that the Prognostikon belongs to this group. A second group includes Epidemics II, IV and VII, written between 399 and 395, *περὶ χυμῶν* (Humors), and the surgical treatises (*κάτ' ἰητρεῖον, μοχλικόν, περὶ ἀγμῶν-περὶ ἄρθρων*). Both groups are very close to each other, and related to these groups are the systematic treatise of Polybos *περὶ φύσιος ἀνθρώπου* (Nature of man), then *περὶ ἀέρων ὑδάτων τόπων* (Airs, Waters, Places) and *περὶ ἱερῆς νούσου* (Epilepsy), the latter too being the work of one author. A third, later, group finally is represented by Epidemics V and VII, a collection of notes written at about 360. While in the other books of Epidemics the prognostic interest is prevalent, books V and VII are chiefly therapeutic in purpose.

In the second part of his study, Deichgräber then examines the traditions on Hippocrates and his disciples, endeavoring to connect the men with the writings. Although he cannot definitely attribute any treatise to Hippocrates, he still strongly believes that the first group mentioned above is the work of Hippocrates himself, and that the second group was at least strongly under his influence.

Deichgräber's monograph is a piece of thorough scholarship. Yet, I must confess that it didn't convince me. The interpretation seems to me arbitrary and far-fetched in many points. Data in the biography of Soranus is accepted as historical when it fits into the picture; otherwise it is rejected as legendary. The interpretation of the Anonymus Londinensis is a *tour de force* of philological acrobatism. All in all, Deichgräber has brought the approach to the problem back to where it was at the time of Littré.

Dr. Edelstein, at the present time, is writing the article on Hippocrates for the Realenzyklopädie of Pauly-Wissowa, and we are anxious to see what he will have to say to the recent publications.

In the 2nd century A. D. Hippocrates was the generally recognized authority on medicine. Galen concludes the century. He is an eclectic, anxiously avoiding any affiliation with a definite school. But there is one master he serves—Hippocrates. He feels himself to be a Hippocratic physician; not a disciple, but a worthy successor to Hippocrates. In a monograph of high scholarship Temkin[41] has pictured the very intricate history of Hippocratism from the time of Galen through the school of Alexandria down to the time of the Arabian conquest. Hippocrates and Galen are intimately connected in this development. The Hippocratism that finds itself established in the 4th century, in Alexandria, due largely to the work of Oribasius, is determined by Galen. This Hippocratism is medical as well as philosophical. The Alexandrian scholars are Iatrosophistae. A final chapter studies the canonization of the works of Galen and Hippocrates, and throws new light on endless detailed problems. Working on that period is like breaking the soil in a virgin forest.

7

Only a few Hippocratic treatises were translated into Latin in the early Middle Ages, until the wave of translations from the Arabic brought new texts. In the later Middle Ages, some Hippocratic treatises, notably the Aphorisms, were much discussed and commented upon, but Galen and Avicenna were the dominating authorities. The Renaissance witnessed a revival of Hippocrates, and from then on, the more the fame of Hippocrates increased, so did the star of Galen decline. He appeared as the ideal doctor. To be called the Hippocrates of one's country was the highest title of honor that could be bestowed upon a physician. Each period looked at him differently, and attributed to him all the qualities it was missing in its own physicians.

Endless papers are being written in our day on Hippocrates and Hippocratic medicine by medical men. They can be divided into three groups.

The first and by far the largest group consists of papers written

[41] Owsei Temkin, Geschichte des Hippokratismus im ausgehenden Altertum, Kyklos, Jahrbuch für Geschichte und Philosophie der Medizin, vol. 4, Leipzig, 1932, pp. 1–80.

without any knowledge of the sources, without any critical sense, mere compilations from current textbooks perpetuating errors from generation to generation. We need not mention them here. The sooner they are forgotten, the better.

Then there is a second group of studies in which medical men examine the medical content of the Corpus Hippocraticum. It need not be emphasized that such studies are extraordinar ly important. The philologist will never be able to carry his investigations over a certain limit. He will always reach the point where the medical man has to step in, with his knowledge of disease and medicine as a whole. Ridiculous mistakes have been made by philologists through ignorance of the medical facts. Only the physician will be able to decide what diseases were observed, how correctly they were seen, what the underlying facts of a theory were, what a therapeutic procedure was worth.

The medical man engaged in such studies, on the other hand, must have some philological knowledge. He must be able to read the original text in the best available edition, must know all about the philological work done before. He must build upon it and continue it. He will have to avoid one mistake that is so often made, namely, to call progressive what is in accordance with our present-day views and to discard as primitive what is different.

A good example of a study belonging to this group is Georg Sticker's paper on Fever and Inflammation in the Hippocratic writings.[42] Temkin's Epilepsy, mentioned before,[27] has to be remembered here too. This is a particularly good example for a very happy combination of philological and medical analysis. Here is a wide field open to investigation. A great deal of work has still to be done on the diseases described in the Corpus Hippocraticum, on the therapy of the Hippocratics. A critical study on Hippocratic dietetics would be extremely welcome.

Two monographs have to be mentioned in this connection, although they are not medical, and although they deal only occasionally with Hippocrates. Both, however, are of great interest to the student of Hippocrates. One is a study on the conception, ideals and methods of

[42] Georg Sticker, Fieber und Entzündung bei den Hippokratikern, Archiv für Geschichte der Medizin, vol. 20, 1928, pp. 150–170, vol. 22, 1929, pp. 313–343, 361–381.

science among the ancient Greeks, by William Arthur Heidel.[43] The chief criticism I have is that it does not sufficiently consider the work done on the subject since 1914. The other book is similar in purpose; a study on the development of the research methods of ancient biology by G. Senn.[44] Prof. Senn is a biologist who has done a great deal of research on Theophrastus, and has devoted two very interesting papers to the experiments described in the Hippocratic writings.[45] His new book traces the development from the early beginnings among the 6th century philosophers, down to Hellenistic times, stressing Theophrastus' contributions, and giving full attention to the physicians.

The third group of medical papers on Hippocrates finally includes studies on Hippocratic medicine as a whole, discussing the general principles—the "spirit" of Hippocratic medicine—which are written from a purely medical point of view. Medicine today has become very efficient, but at the same time highly technical and mechanized. It was not so in the time of Hippocrates. Many physicians, dissatisfied with present-day conditions, feel themselves compelled to "go back to Hippocrates." They interpret the Hippocratic writings in their own way, valuing not the technical knowledge, but the general attitude of the Hippocratic physician towards nature and disease. They write on Hippocrates in order to influence modern medicine.

Typical of this special line is the work of the great Berlin surgeon August Bier. He wrote a long series of articles on Hippocratism,[46]

[43] William Arthur Heidel, The Heroic Age of Science, Carnegie Institution of Washington, Publication No. 442, Baltimore, 1933.

[44] G. Senn, Die Entwicklung der biologischen Forschungsmethode in der Antike und ihre grundsätzliche Förderung durch Theophrast von Eresos, Veröffentlichungen der Schweizerischen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften, VIII, Aarau, 1933.

[45] G. Senn, Ueber Herkunft und Stil der Beschreibungen von Experimenten im Corpus Hippocraticum, Archiv für Geschichte der Medizin, vol. 22, 1929, pp. 217–289.—Nochmals die Experimente im Corpus Hippocraticum, Verhandlungen der Naturforschenden Gesellschaft in Basel, vol. 41, 1931, pp. 109–128.—See also O. Regenbogen, Eine Forschungsmethode antiker Naturwissenschaft, Quellen und Studien zur Geschichte der Mathematik, Abt. B. Studien, vol. 1, Berlin, 1930, pp. 131–182.

[46] August Bier, Hippokratismus, Münchener Medizinische Wochenschrift, vol. 77, 1930, p. 2193; vol. 78, 1931, pp. 113, 154, 355, 408, 483, 540, 919, 961.

giving a summary of his studies in a shorter paper,[47] the beginning of which characterizes the whole attitude splendidly: "The essence of Hippocratism *to which we have to revert under any circumstances*, is the concept of physis with the subordinate concepts of constitution, right and wrong mixture of the body, attraction and reversion."

The same attitude is shown in a book of the bacteriologist Hans Much, which appeared under the title, "Hippocrates the Great."[48] The book has nothing whatever to do with Hippocrates. The name is merely a symbol, a flag under which Dr. Much expressed his general ideas on medicine.

A similar study was written in Italy by Liborio Giuffrè,[49] and Arturo Castiglioni gave a good analysis of the whole trend.[50]

This neo-Hippocratism is a distinctly romantic movement. And it is not by accident that it is located chiefly in Germany and Italy, in those two countries in which State and society are built upon the foundation of an irrational mystical philosophy.

8

Two medical journals today are published under the title "Hippocrates"; one is German, the otherFrench. They are very different in character.

The German journal was launched in 1928.[51] I was one of the co-editors of the first volumes, so that I am pretty familiar with its history. The idea was to create an independent medical journal, an open forum for medical discussions. There was a great deal of unrest in postwar German medicine. At the same time, powerful medical bodies and certain big publishing firms endeavored to suppress certain trends. Psychoanalysis was banned. A homeopath could not have a paper printed outside his own periodicals. The new journal published

[47] August Bier, Hippokratische Studien, Quellen und Studien zur Geschichte der Naturwissenschaften und der Medizin, vol. 3, no. 2, Berlin, 1932, pp. 1–28.

[48] Hans Much, Hippokrates der Grosse, Stuttgart, Berlin, 1926.

[49] Liborio Giuffrè, La Dottrina d'Hippocrate, Palermo, 1933–XI.

[50] Arturo Castiglioni, L'orientamento neoippocratico del pensiero medico contemporaneo, Torino, 1933–XI.

[51] Hippokrates, Zeitschrift für Einheitsbestrebungen der Gegenwartsmedizin. The present title is, Hippokrates, Zeitschrift für praktische Medizin, Organ für Einheitsbestrebungen in der Medizin, Hippokrates-Verlag, Stuttgart, Leipzig.

with Hippocrates as patron saint was to be open to every honest worker, regardless of his creed, willing and able to contribute to the advancement of medicine.

The new journal was started with great enthusiasm, but soon proved to be a failure. Many papers published were insignificant, others were printed that were not worth the ink wasted on them, the really good and valuable contributions would have had much more influence had they been published in any of the weekly journals. The editor, Georg Honigmann, died in 1931 and the publication was interrupted until 1933. Today "Hippocrates" is a small, provincial sectarian journal.

The French "Hippocrate" began its career in March, 1933.[52] It is called a "Revue d'Humanisme Médical," and is edited by Dr. Laignel-Lavastine, Professor of Medical History at the Paris Faculty. It is not a scholarly journal, and does not pretend to be. The idea is to keep the doctor in touch with what is going on in the various fields of Arts and Sciences. The articles published deal with medical history, general history, history of art and literature. They are never profound, but usually interesting. Each number publishes "chroniques," surveys of the different fields and book reviews. The reader in this way hears what is being done in philosophy, psychology, biology, poetry, music, etc.

Is this medical humanism? Probably not. But the journal is well done, original in purpose, and it certainly fulfills a not unimportant function.

9

It is a great thing that the medical profession has in Hippocrates a living ideal, a hero that it can worship and follow. However, this should not prevent the historian from seeking the truth. Investigating the sources critically, he will have to destroy illusions occasionally. The ideal will remain untouched.

The purpose of this very fragmentary review was to give a brief picture of the various activities in the field of Hippocratic research. Important work is being done, work that should be taken into careful consideration by all medical men who talk and write on Hippocrates.

[52] Hippocrate, Revue d'Humanisme Médical, Paris, 15, Rue du Sommerard.